Appendix B - Plans

Note: Document has been split into parts due to its size.

Apendix B_16 pages in total

Appendix B split in parts_part 3_pages 5 to 16 only

290000 295000 300000 305000

6200000

6195000

LAKE CATARACT

LAKE CORDEAUX

A

A'

MOUNT OUSLEY ROAD

PICTON ROAD

APPIN ROAD

SOUTHERN FREEWAY

CATARACT

BELLANGLO

Legend

- Places
- Road
- Rail Line
- Power Line
- Fence
- Cross Section Line
- Elevation Countor (10m Interval)
- Cataract Damwall
- Conveyor

Stream Order

- 1st Order
- 2nd Order
- 3rd Order
- 4th Order
- 5th Order
- Project Application Area
- Current Leases
- Freehold Area
- Water New South Wales Land
- Cadastral
- Reservoir

Primary Domain

- Infrustructure Area
- Water Management Area
- Stockpiled Material Area
- Underground Mining Area

Infrastructure

- Electrical Instalation
- Surface Buildings

(C) Copyright Commonwealth of Australia (Geoscience Australia) 2006
(C) Nearmap 04/06/2015

I, Rhys Brett, holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the proposed development.

Mine Manager Date

I, Craig Stratton, Registered Mine Surveyor, certify that to the best of my knowledge and belief this plan conforms to the accuracy & standards required by NSW Trade and Investment - Division of Resources and Energy.

Registered Mining Surveyor Date

N

0 200 400 600 800 1,000
Meters

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 1994

REV	DESCRIPTION	DATE	DRN	CKD

WOLLONGONG COAL

WCL Russell Vale Colliery
Wollongong Coal Limited

	NAME	DATE	TITLE
DRN	RT	30/11/15	MINING OPERATIONS PLAN
CKD			PLAN-2- MINE DOMAINS AT COMMENCEMENT OF MOP
APP			
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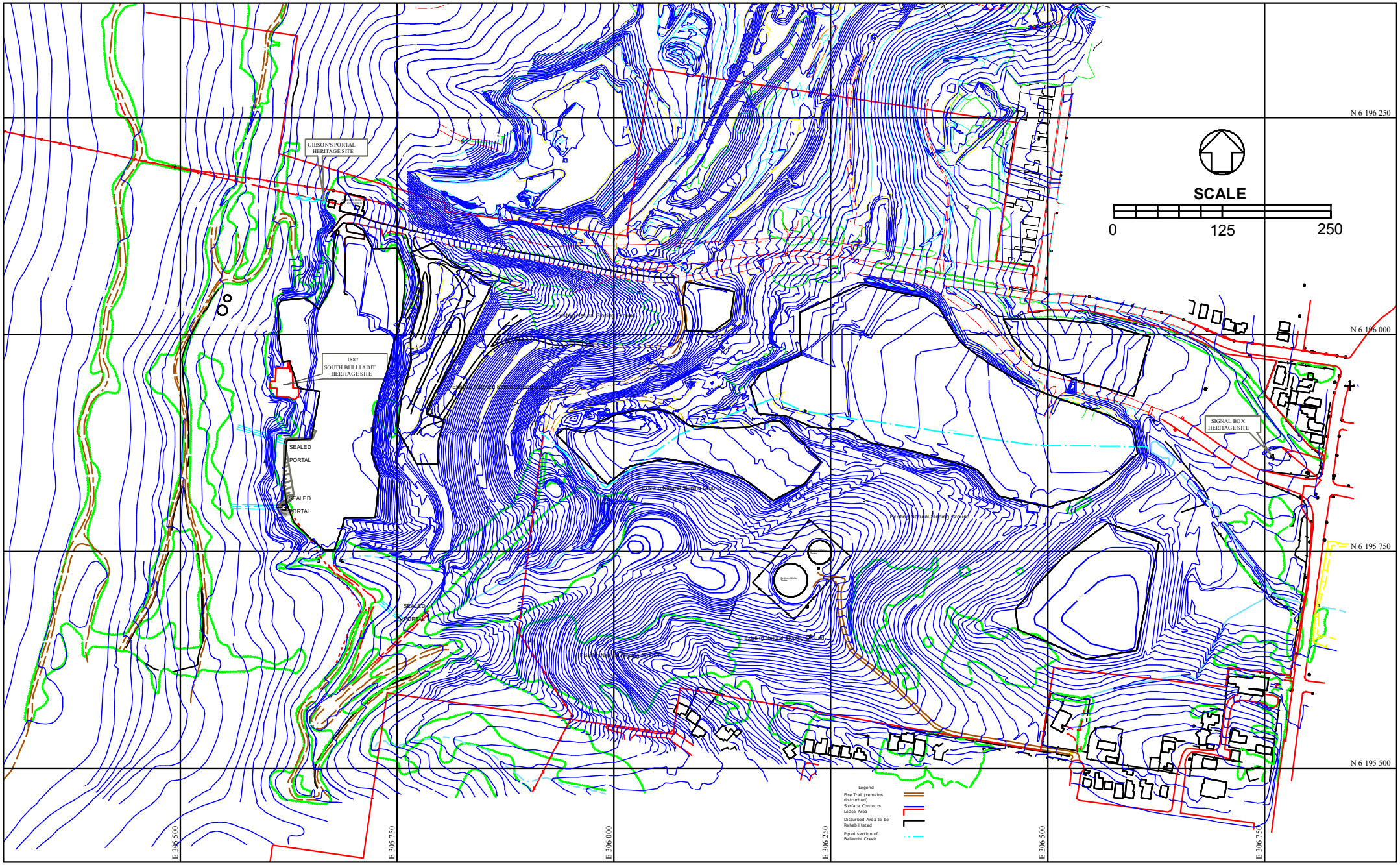
			REV 0



REV	DESCRIPTION	DATE	DRN	CKD

WOLLONGONG COAL

RUSSELL VALE COLLIERY

	NAME	DATE
DRN	GH	22/09/16
CKD		
APP		
SCLAE	1:2 000 @ A4	
~~NTS~~		

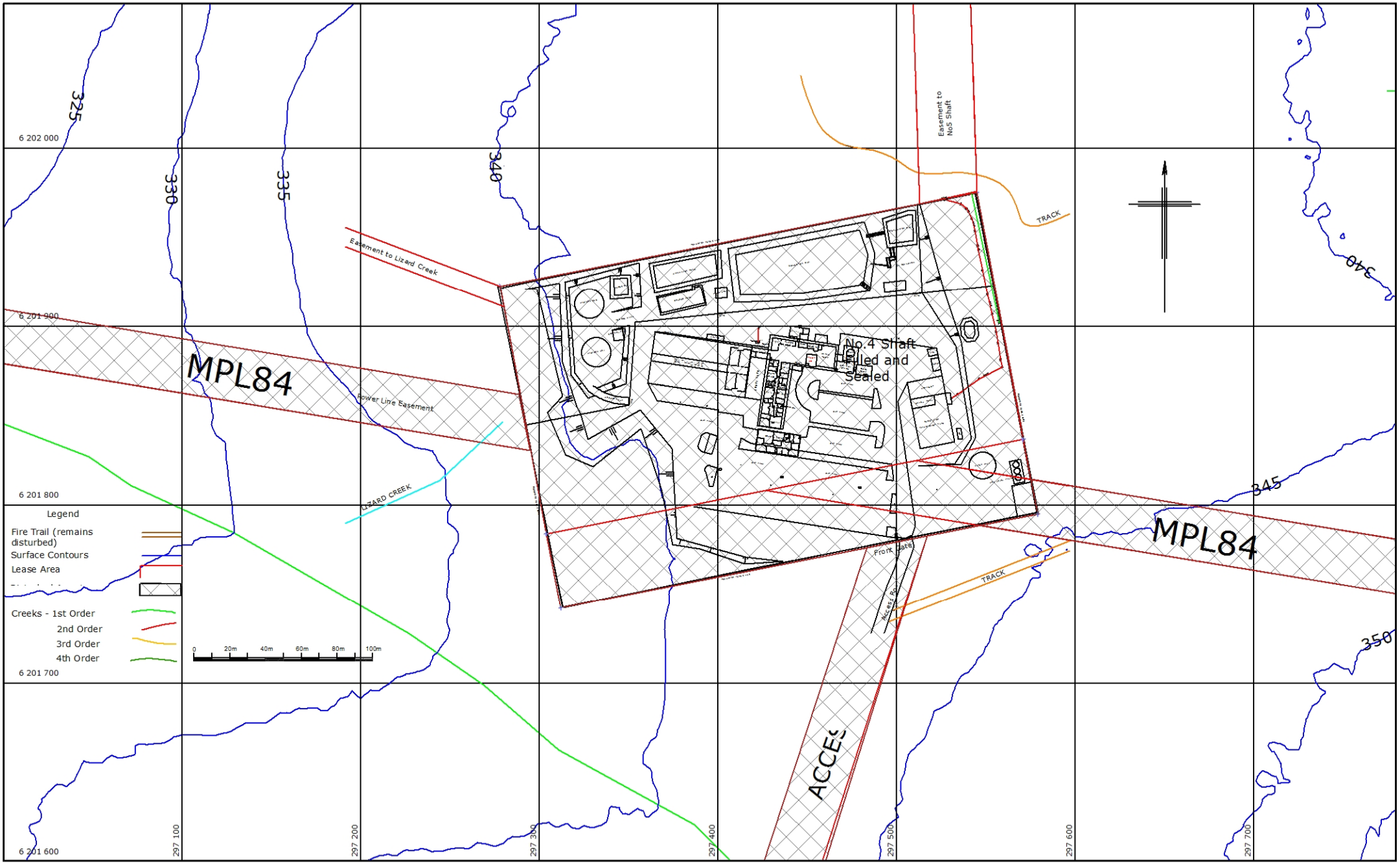
Title

Russell Vale Project

Russell Vale Pit Top Conceptual Post Mining Final Landform Plan

DRAWING NUMBER: RVC-MOP PLAN: 4A

REV: 0



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RUSSELL VALE COLLIERY

	NAME	DATE
DRN	GH	22/09/16
CKD		
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Title

Russell Vale Project

Russell Vale No. 4 Shafts: Conceptual Post Mining Land Use Plan

DRAWING NUMBER: RVC-MOP PLAN: 4B

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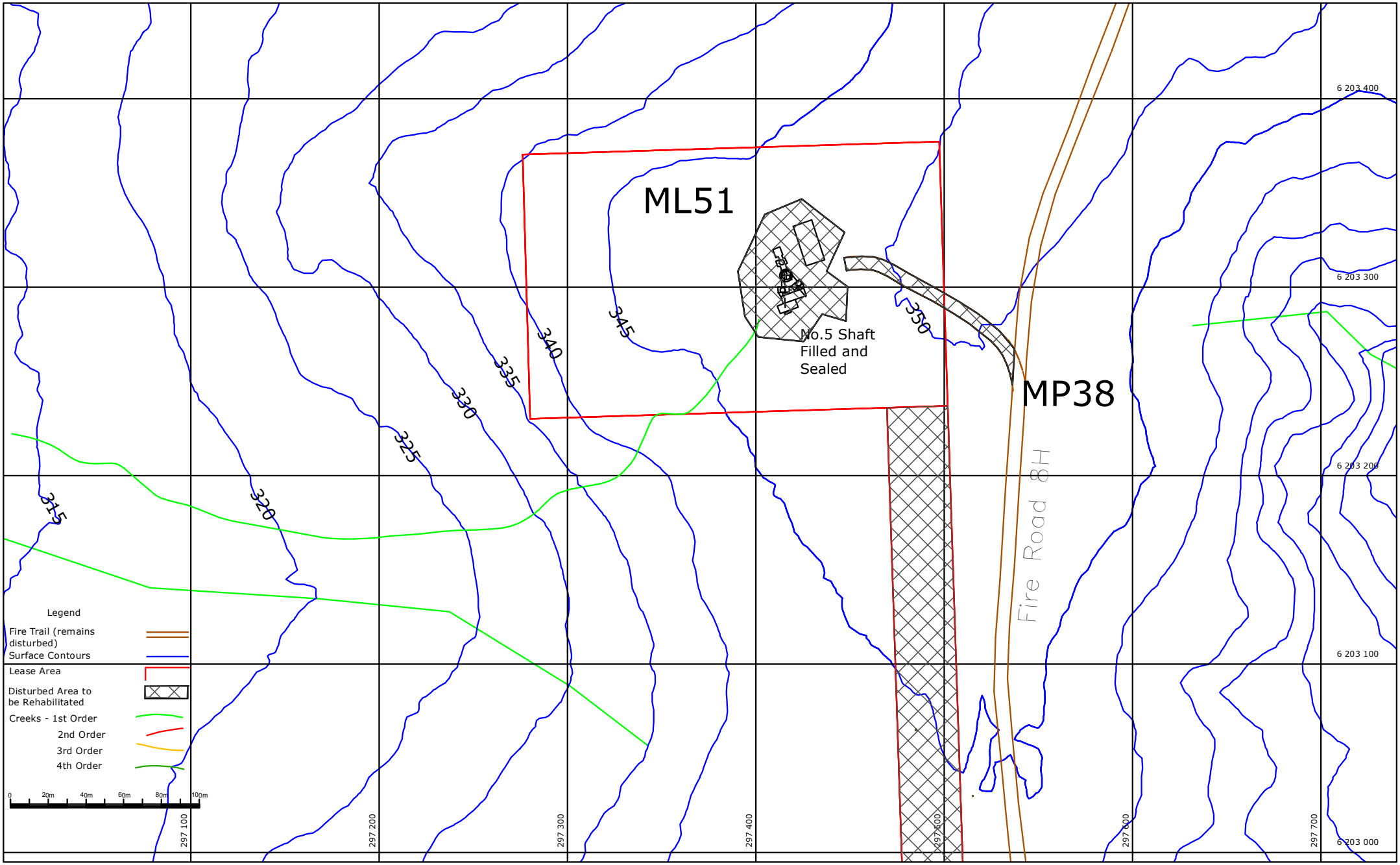

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RUSSELL VALE COLLIERY

	NAME	DATE	Title
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CKD			**Russell Vale No. 5 Shafts: Conceptual Post Mining Land Use Plan**
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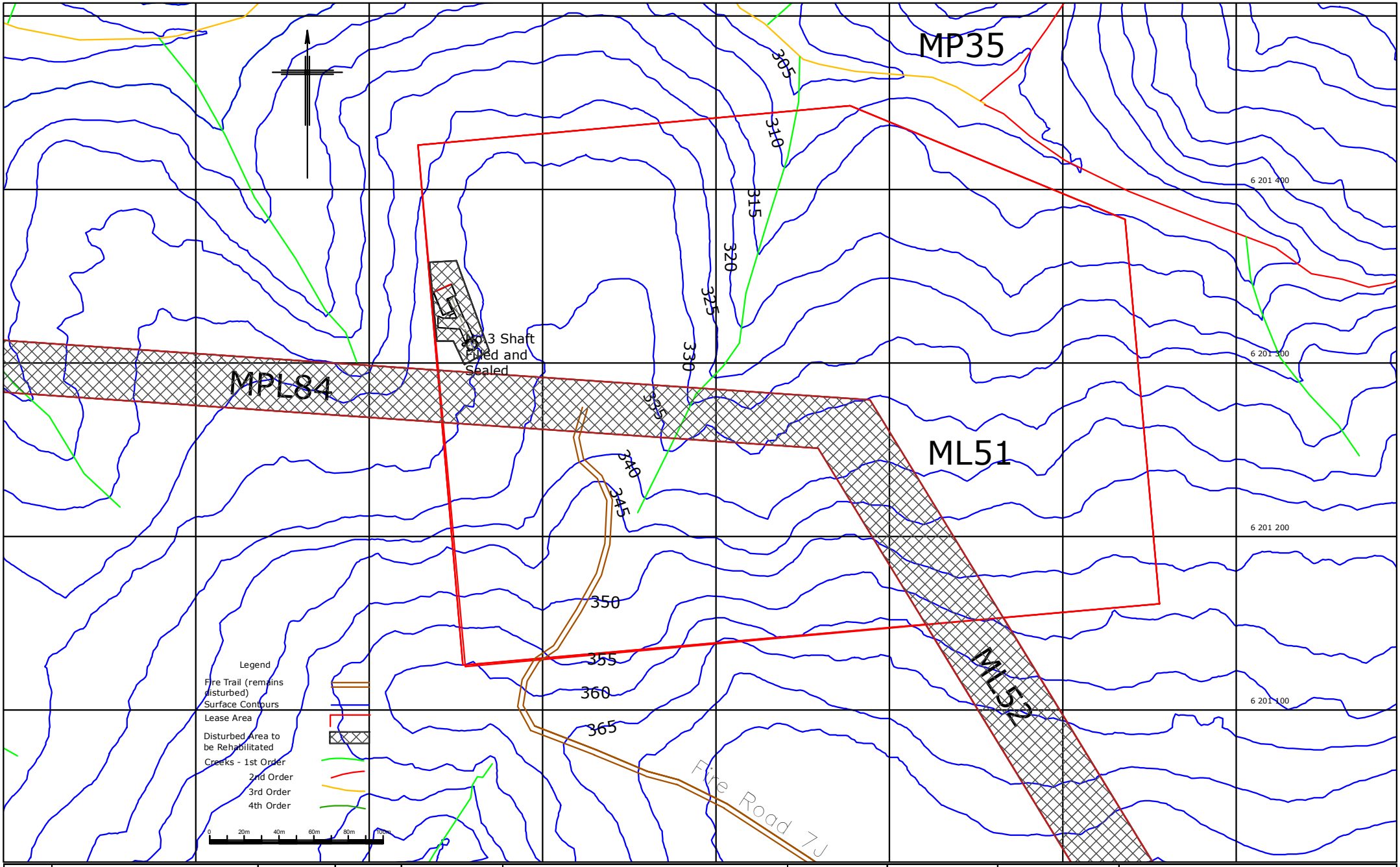

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RUSSELL VALE COLLIERY

	NAME	DATE
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CKD		
APP		
SCLAE	1:2 000 @ A4	
~~NTS~~		

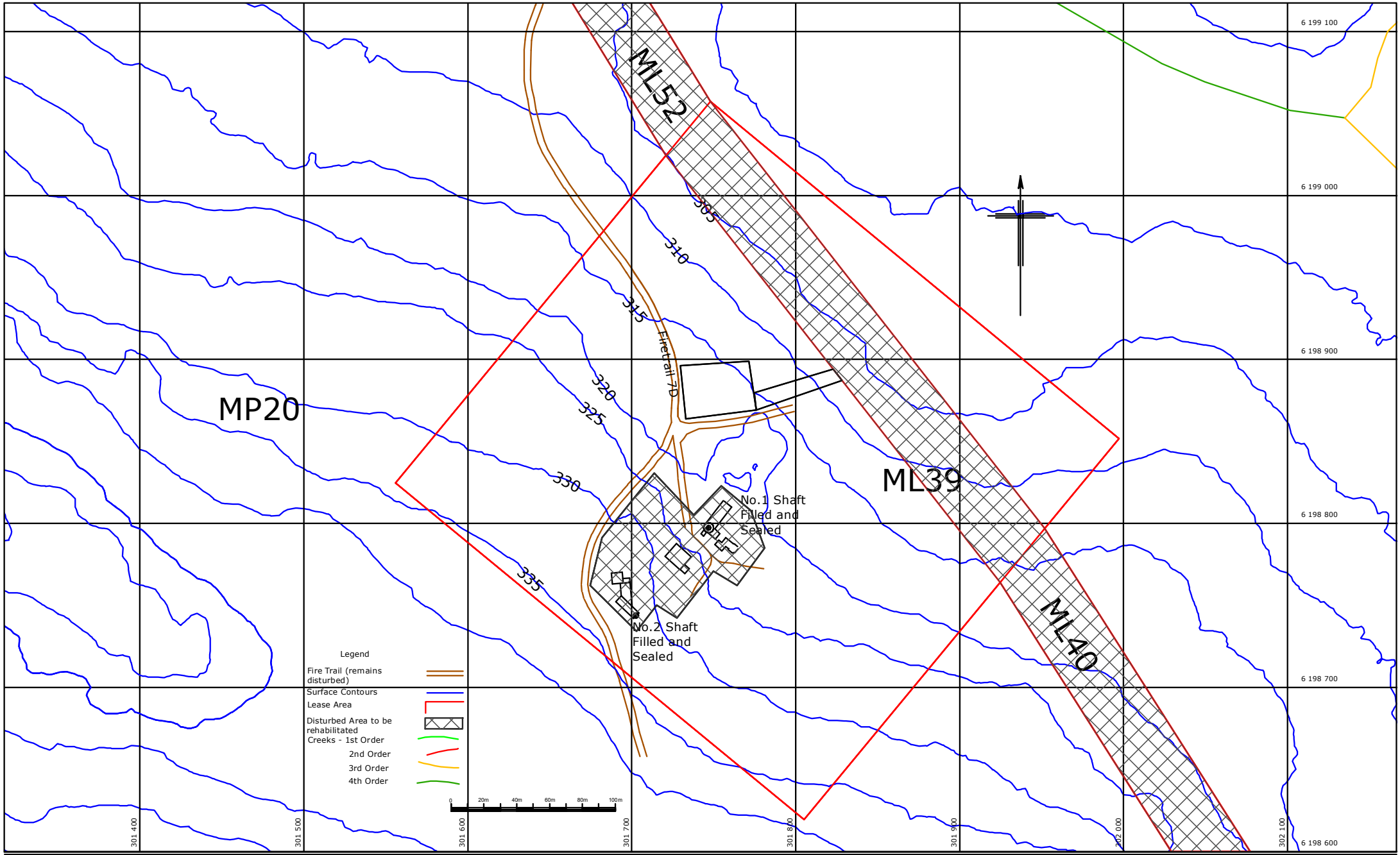
Title

Russell Vale Project

Russell Vale No. 3 Shafts: Conceptual Post Mining Land Use Plan

DRAWING NUMBER: RVC-MOP PLAN: 4D

REV



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RUSSELL VALE COLLIERY

	NAME	DATE
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CKD		
APP		
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Title

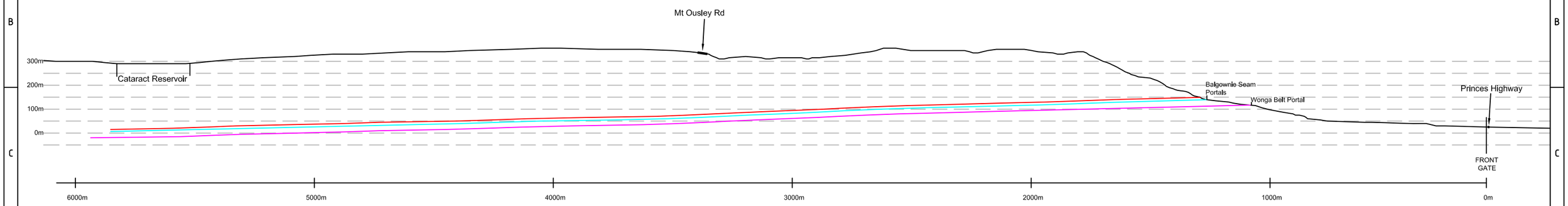
Russell Vale Project

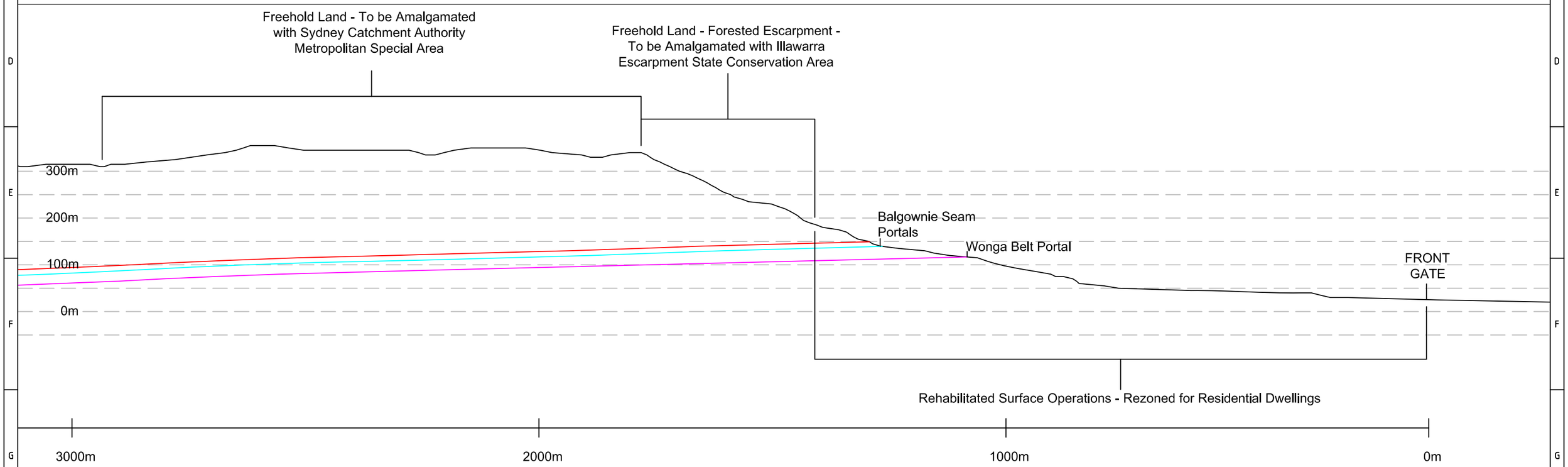
Russell Vale No. 1 and No. 2 Shafts Conceptual Post Mining Land Use Plan

DRAWING NUMBER: RVC-MOP PLAN:4E

REV

Section A - A





Final Ground Level

Bulli Seam (No.1 Seam)

Balgownie Seam (No.2 Seam)

Wongawilli Seam (No.3 Seam)

I, Rhys Brett, holder of Mine Managers Certificate of Competency, certify that the information on this plan is a true indication of the proposed development.

..... Mine Manager ..... Date

I, Craig Stratton, Registered Mine Surveyor, certify that to the best of my knowledge and belief this plan conforms to the accuracy and standards required by NSW Trade and Investment - Division of Resources and Energy.

..... Registered Mining Surveyor ..... Date

REV	DESCRIPTION	DATE	DRN	CKD	REV	DESCRIPTION	DATE	DRN	CKD

WOLLONGONG COAL

WCL Russell Vale Colliery
Wollongong Coal Limited
7 Princes Highway, Corrimal
N.S.W. 2518
ABN 28 111 244 896

	Name	Date
DRN	RT	16/12/16
CKD		
APP		
SCALE	AS SHOWN	

Title: Mining Operations Plan
Plan 5 - Rehabilitation and Post Mining Land Use Cross Section

DRAWING NUMBER: RVC-MOP-5A

REV: 0

RUSSELL VALE COLLIERY

Loccation of Monitoring/
Discharge Points

Environment Protection Licence
Licence No.: 12040

Legend

- Water Monitoring Location
- Dust Monitoring Point
- Meteorological Monitoring Station
- Fire Trails
- Road & Tracks
- RVC Lease Boundary

N

0 0.1 0.2
Kilometers

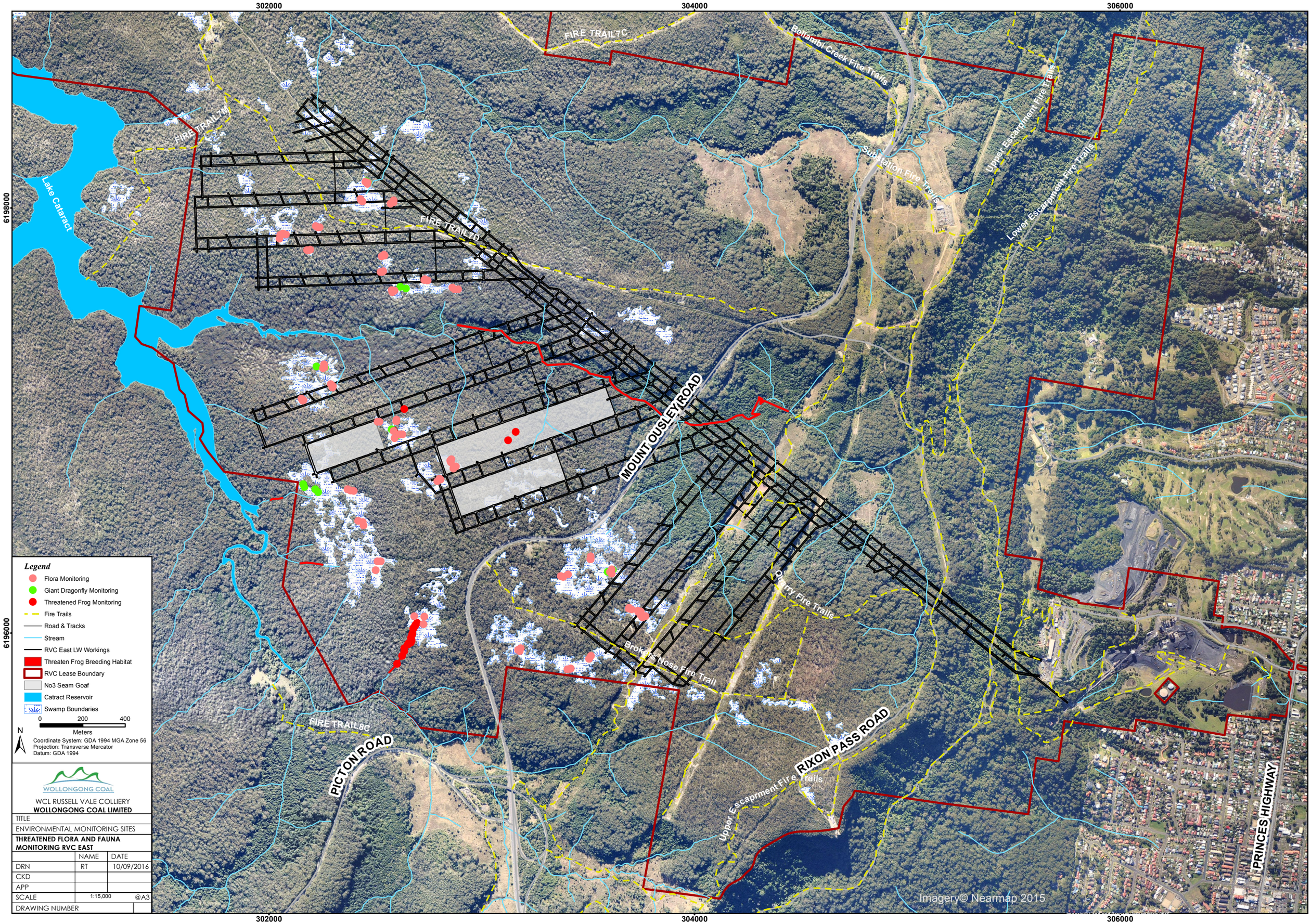
1:4,000 @A3

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 1994

WOLLONGONG COAL

WCL Russell Vale Colliery

Wollongong Coal Limited
7 Princes Highway, Corrimal, NSW 2518
ABN 28 111 244 896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FIRE TRAIL7W
Lake Cataract
FIRE TRAIL7D
Substation Fire Trails
Upper Escarpment Fire Trails
Lower Escarpment Fire Trails
MOUNT OUSLEY ROAD
Quarry Fire Trails
Broken Nose Fire Trail
FIRE TRAIL6C
PICTON ROAD
RIXON PASS ROAD
Upper Escaprment Fire Trails
PRINCES HIGHWAY
Imagery© Nearmap 2015
Legend
Flora Monitoring
Giant Dragonfly Monitoring
Threatened Frog Monitoring
Fire Trails
Road & Tracks
Stream
RVC East LW Workings
Threaten Frog Breeding Habitat
RVC Lease Boundary
No3 Seam Goaf
Catract Reservoir
Swamp Boundaries
0 200 400
Meters
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Projection: Transverse Mercator
Datum: GDA 1994
WOLLONGONG COAL
WCL RUSSELL VALE COLLIERY
WOLLONGONG COAL LIMITED
TITLE
ENVIRONMENTAL MONITORING SITES
THREATENED FLORA AND FAUNA MONITORING RVC EAST
NAME
DATE
DRN
RT
10/09/2016
CKD
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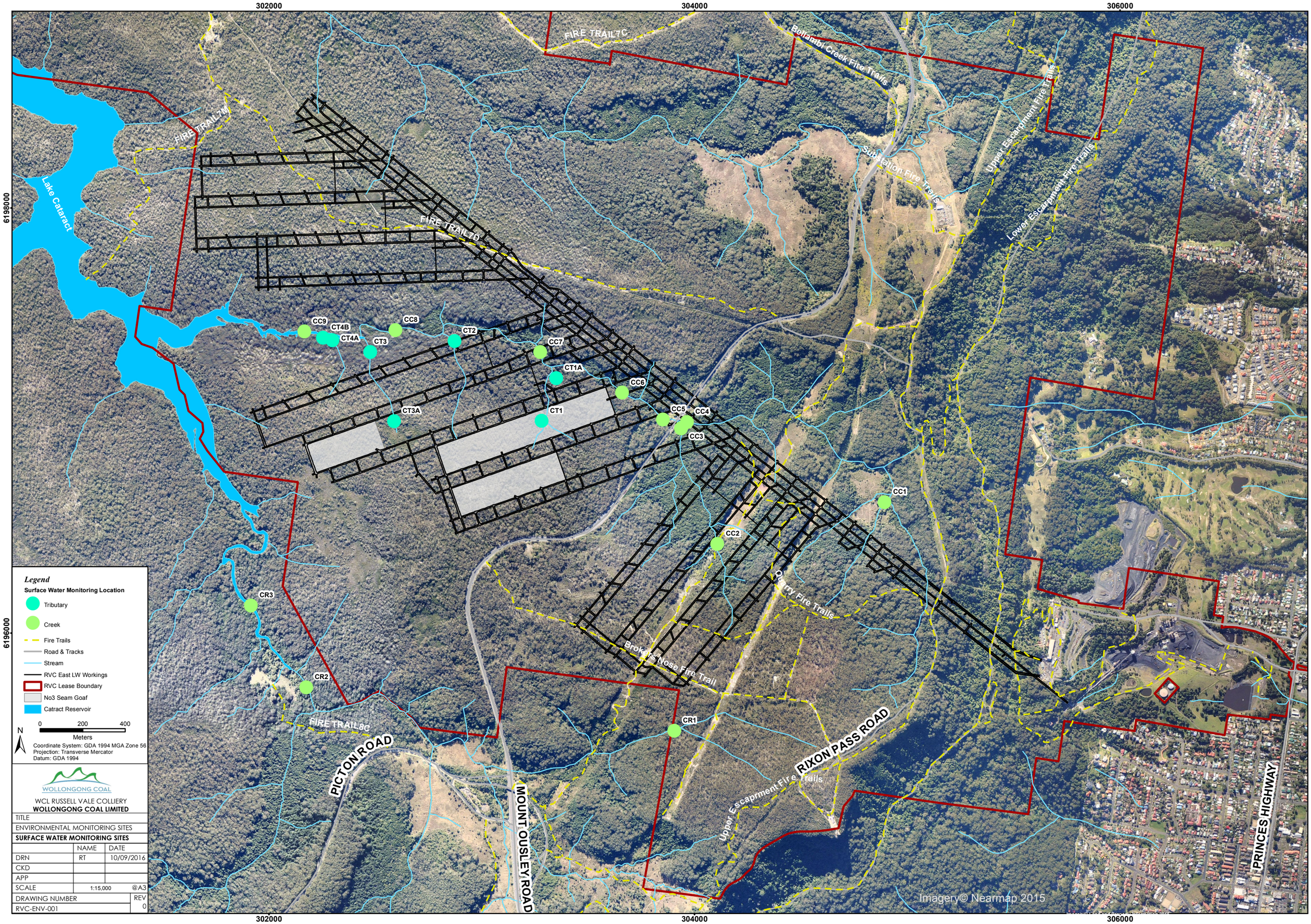
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Bellambi Creek Fire Trails
FIRE TRAIL7W
Lake Cataract
FIRE TRAIL7D
Substation Fire Trails
Upper Escarpment Fire Trails
Lower Escarpment Fire Trails
CC9
CT4B
CT4A
CC8
CT3
CT2
CC7
CT1A
CC6
CT3A
CT1
CC5
CC4
CC3
CC1
CC2
Quarry Fire Trails
Broken Nose Fire Trail
CR3
CR2
CR1
FIRE TRAIL8C
PICTON ROAD
MOUNT OUSLEY ROAD
RIXON PASS ROAD
Upper Escaprment Fire Trails
PRINCES HIGHWAY
Imagery© Nearmap 2015
Legend
Surface Water Monitoring Location
Tributary
Creek
Fire Trails
Road & Tracks
Stream
RVC East LW Workings
RVC Lease Boundary
No3 Seam Goaf
Catract Reservoir
0 200 400
Meters
N
Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 1994
WOLLONGONG COAL
WCL RUSSELL VALE COLLIERY
WOLLONGONG COAL LIMITED
TITLE
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SURFACE WATER MONITORING SITES
NAME DATE
DRN RT 10/09/2016
CKD
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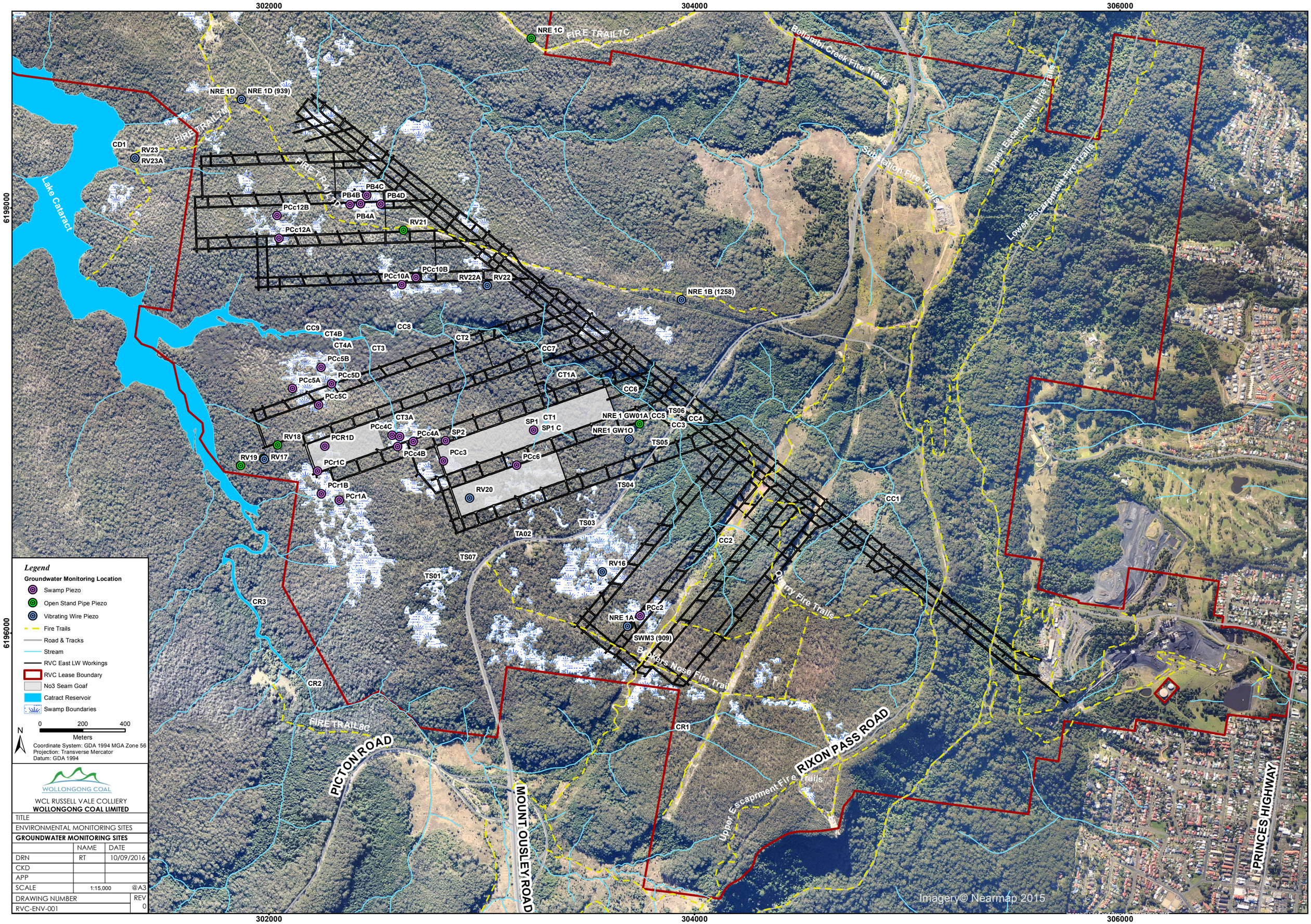
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NRE 1C
FIRE TRAIL7C
Bellambi Creek Fire Trails
NRE 1D
NRE 1D (939)
FIRE TRAIL7W
CD1
RV23
RV23A
Lake Cataract
FIRE TRAIL7D
PB4C
PB4B
PB4D
PB4A
PCc12B
PCc12A
RV21
PCc10B
PCc10A
RV22A
RV22
NRE 1B (1258)
Substation Fire Trails
Upper Escarpment Fire Trails
Lower Escarpment Fire Trails
CC9
CT4B
CT4A
CC8
CT3
CT2
CC7
PCc5B
PCc5D
PCc5A
PCc5C
CT1A
CC6
CT3A
PCc4C
PCc4A
SP2
SP1
CT1
SP1 C
NRE 1 GW01A
CC5
TS06
CC4
CC3
NRE1 GW1O
TS05
RV18
PCR1D
RV19
RV17
PCc4B
PCc3
PCc6
PCr1C
PCr1B
PCr1A
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TS04
CC1
TS03
TA02
CC2
TS07
RV16
TS01
CR3
PCc2
NRE 1A
SWM3 (909)
Quarry Fire Trails
Bulkers Nose Fire Trail
CR2
FIRE TRAIL8C
CR1
RIXON PASS ROAD
PICTON ROAD
MOUNT OUSLEY ROAD
Upper Escaprment Fire Trails
PRINCES HIGHWAY
Imagery© Nearmap 2015
Legend
Groundwater Monitoring Location
Swamp Piezo
Open Stand Pipe Piezo
Vibrating Wire Piezo
Fire Trails
Road & Tracks
Stream
RVC East LW Workings
RVC Lease Boundary
No3 Seam Goaf
Catract Reservoir
Swamp Boundaries
0 200 400
Meters
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WOLLONGONG COAL
WCL RUSSELL VALE COLLIERY
WOLLONGONG COAL LIMITED
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GROUNDWATER MONITORING SITES
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DATE
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10/09/2016
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RVC-ENV-001
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FIRE TRAIL7C
Bellambi Creek Fire Trails
FIRE TRAIL7D
FIRE TRAIL7W
Substation Fire Trails
Upper Escarpment Fire Trails
Lower Escarpment Fire Trails
Lake Cataract
52-3-0310
52-2-0099
52-2-0603
52-2-0083
52-2-0319
52-2-0312
52-2-0317
52-2-0314
Wonga East 3
Wonga East 1
Robber's Roost
Wonga East 2
52-2-0311
52-3-0323
52-3-0325
MOUNT OUSLEY ROAD
52-2-0320
52-2-0322
52-2-0318
52-3-0313
Broken Nose Fire Trail
FIRE TRAIL8C
PICTON ROAD
RIXON PASS ROAD
Upper Escaprment Fire Trails
PRINCES HIGHWAY

Imagery© Nearmap 2015

Legend

- Cultural Heritage Site
- Fire Trails
- Road & Tracks
- Stream
- RVC East LW Workings
- RVC Lease Boundary
- No3 Seam Goaf
- Catract Reservoir

0 200 400
Meters

N

Coordinate System: GDA 1994 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 1994

WOLLONGONG COAL

WCL RUSSELL VALE COLLIERY
WOLLONGONG COAL LIMITED

TITLE		
ENVIRONMENTAL MONITORING SITES		
CULTURAL HERITAGE SITES		
	NAME	DATE
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CKD		
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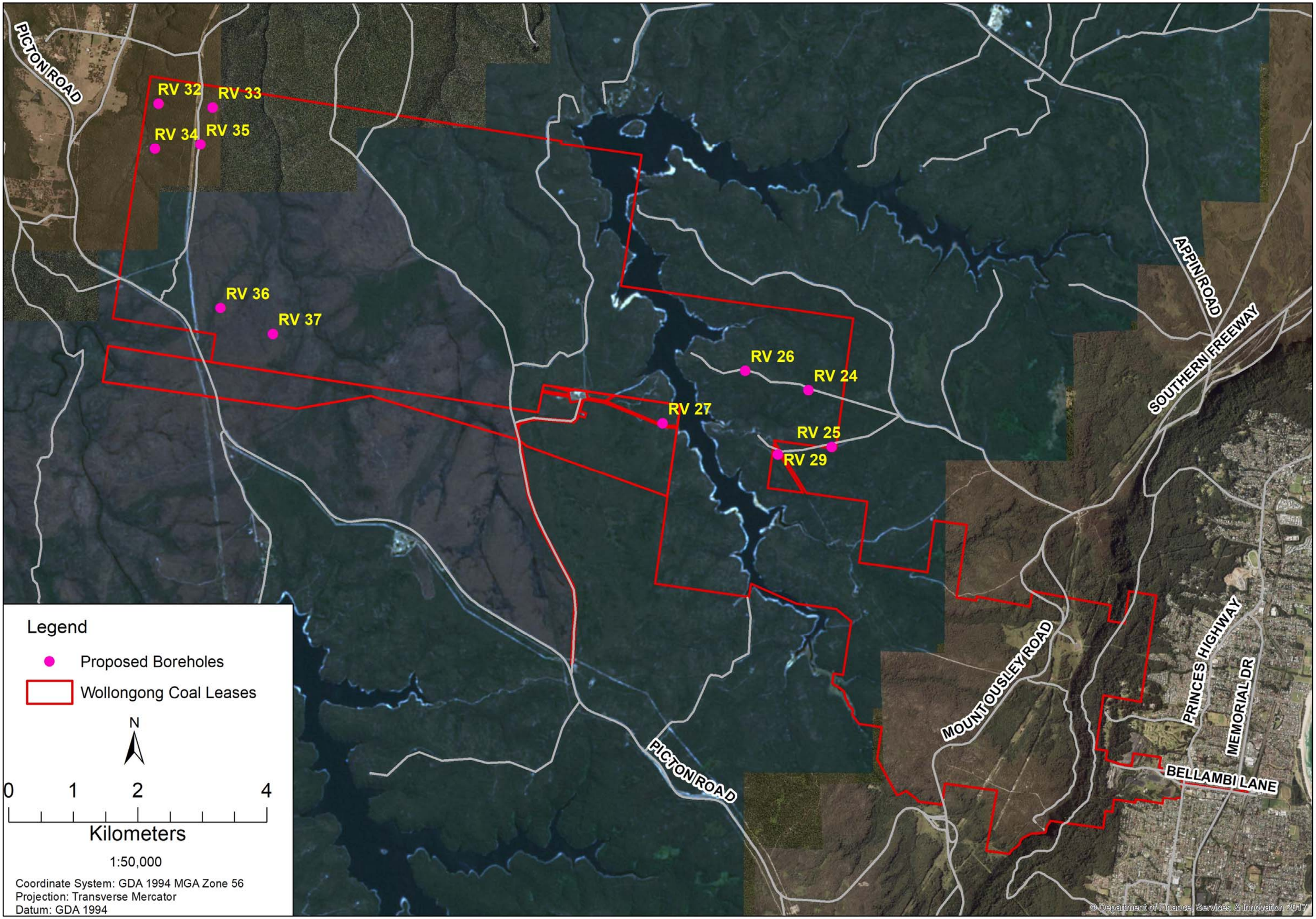
PICTON ROAD
RV 32
RV 33
RV 34
RV 35
RV 36
RV 37
RV 26
RV 24
RV 27
RV 25
RV 29
APPIN ROAD
SOUTHERN FREEWAY
MOUNT OUSLEY ROAD
PRINCES HIGHWAY
MEMORIAL DR
BELLAMBI LANE
PICTON ROAD
Legend
Proposed Boreholes
Wollongong Coal Leases
N
0 1 2 4
Kilometers
1:50,000
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Datum: GDA 1994
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Appendix C – Operational Risk Assessment

RISK ASSESSMENT
SIGN OFF/ APPROVAL SHEET

OPERATION: Russell Vale Colliery	RA Document Control Number: MOP_MP09_0013
Risk Assessment Title: Mining Operations Plan (MOP) - Operations under Development Consent MP09_0013 (December 8th, 2020).	
AUTHOR/ OWNER: Name: Wayne Sly	Title: Chief Operating Officer (COO)
REVIEWS	

RISK ASSESSMENT FOLLOWED PROCESS? SPECIFIC COMMENTS / ACTION REQUIRED:	**Supervisor - Health & Safety** NAME: G. Dixon SIGNATURE: DATE: 17/5/21
SPECIFIC COMMENTS / ACTION REQUIRED:	**Tech Services Manager** NAME: D. Vyas SIGNATURE: DATE: 17/5/21
SPECIFIC COMMENTS / ACTION REQUIRED:	**Production Manager** NAME: D. Jamieson SIGNATURE: DATE: 17/5/21
SPECIFIC COMMENTS / ACTION REQUIRED:	**Operations Manager** NAME: W. Sly SIGNATURE: DATE: 17/5/21
SPECIFIC COMMENTS / ACTION REQUIRED:	**Mining Engineering Manager** NAME: W. Lidbury SIGNATURE: DATE: 17/5/21

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Mining Operations Plan (MOP) Risk Assessment

1. INTRODUCTION

The Mining Operations Plan (MOP) describes the arrangements and proposed management of the Russell Vale Colliery during this MOP term. It has been compiled in accordance with, the NSW Department of Trade and Investment, Regional Infrastructure and Services (ESG3) Mining Operations Plan (MOP) Guidelines (September 2013) and Development Consent MP09_0013 (December 2020).

History of Operations

The mine is located at Russell Vale approximately 8 km north of Wollongong and 70 km south of Sydney (see Figure 1), within the local government areas (LGAs) of Wollongong and Wollondilly in the Illawarra region of NSW. The total lease area covered by Russell Vale Colliery is 69.73 square kilometres.

The South Bulli Coal Mining Company commenced mining on the slopes of the Illawarra Escarpment in the late-19th Century. Continuous mining has occurred since 1887 and surface facilities have operated at the Russell Vale site since this time.

Historically operations at Russell Vale Colliery have undertaken mining activities in the Wongawilli, Balgownie and Bulli seams at varying depths of cover. Most recent mining has occurred in the Wongawilli Seam.

Mining of the Wongawilli seam (No. 3 seam) reserves in the area has been undertaken for more than 15 years. Prior to mining within the No. 3 seam, initial mining in the area was undertaken in the Bulli seam (No. 1 seam) and Balgownie (No. 2 seam)

The economic working section of the Wongawilli coal seam is in the order of 2.4 to 4.0 metres thick in the present mining area. The mined seam thickness is primarily governed by localised variations between marker bands as well as changes in stress magnitudes and stone rolls. Approximately 76% of the coal mined in this seam section is recoverable. The Wongawilli seam, normally mined from the natural seam floor to one of the more prominent shale bands, is relatively high in ash content and low yielding.

With the advent of more sophisticated mining methods in the 1960s, workings progressed further west of the Illawarra Escarpment. Subsequently, four ventilation shafts (Shaft Numbers 1, 2, 3 and 5) and a shaft to provide personnel and materials access to the workings (No. 4 Shaft) were sunk to the west of the escarpment. Mining commenced in the early 1990's beneath the catchment of Cataract Dam.

In August 2004, production temporarily ceased and the mine was placed on care and maintenance until 3 December 2004 when it was sold to NRE by Bellpac Pty Ltd. Mining recommenced at NRE No.1 Colliery in July 2005. The coal washery at Russell Vale ceased operation in March 2003.

NRE mined the Bulli seam in areas known as 310, 312 and 'P' panels, as well as in the Wongawilli seam in an area known as Wonga Mains and LW 4 and 5 in Wonga East. Wollongong Coal Limited mined the first 365m of LW6 which ended in July 2015. All ROM coal is transported unwashed to PKCT as there is no coal washery on site.

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In early 2020, the old Bulli and Balgownie seam mine workings were decommissioned with the eastern portal entries secured against access to personnel. The Catchment infrastructure has been subsequently decommissioned and secured. The Wongawilli seam workings remain in use. This significantly reduces the underground operational mine area.

The Russell Vale Colliery site contains the Wongawilli Seam main mine portals and caters for mine ventilation, men, mining equipment, vehicle and machinery maintenance, mine supplies, administration, coal transport to the surface, and an 80,000-tonne capacity coal stockpiling facility.

There is currently one main transport entry into the mine, namely a roadway for rubber tyred vehicles. The rubber tyred vehicles are the primary transport system that services the mine. Coal was transported from the workings to the surface of the mine via conveyor.

Consent was granted on December 8th, 2020 by the Independent Planning Commission of NSW, as the declared consent authority under Clause 8A of the State Environmental Planning Policy (State and Regional Development) 2011 and section 4.5 (a) of the Environmental Planning and Assessment Act 1979, to approve the development application referred to in the Development Consent.

This consent defines the conditions for WCL to resume operations at Russell Vale Mine. These conditions granted under the consent;

- Prevent, minimise and/or offset adverse environmental impacts,
- Set standards and performance measures for acceptable environmental performance,
- Require regular monitoring and reporting; and
- Provide for the ongoing environmental management of the development.

2. CONTEXT STRATEGY, CORPORTATE AND RISK MANAGEMENT

The process followed in this review was based on the Wollongong Coal Risk Management Procedure. This procedure is consistent with the requirements of the NSW Trades and Investment Mine Safety MDG1010 Guidelines for Risk Management and Risk Assessment and as well as the Australian / NZ Standard for Risk Management AS/NZ/ISO:31000:2009.

The results from the risk assessment will be used to ensure all controls including practices and procedures, are adequate for the identified risks.

3. OBJECTIVES AND SCOPE

The primary objective of this risk assessment is to assist to fulfil the requirements of the NSW Resources Regulator ESG3: Mining Operations Plan (MOP) Guidelines, September 2013 which details a process for monitoring and managing progression towards successful rehabilitation outcomes.

The Mining operations plan (MOP) requires Russell Vale Colliery to identify and provide measurable data and demonstrate that proposed rehabilitation outcomes are achievable and realistic within a given timeframe. This underpinning risk assessment of

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the Mining operations plan (MOP), will analyse the risks to successfully achieving the requirements and to make recommendations for further controls where appropriate.

The main consideration is environmental impact, however, harm to people's safety and health, business interruption and damage, impact on reputation, social and community issues and legal and regulatory impact will be considered where relevant.

The risk assessment scope was restricted to Russell Vale Colliery and includes both the pit top area and SMP and Catchment Lease Areas. Local residences are also included in the scope of the assessment with the ability to affect the residences by noise, dust, water and lighting impacts.

The significant change of the Development Consent is the conditions to resume mining operations at Russell Vale Mine. The 118 development consent conditions are the result of a detailed examination of the mining and ancillary operations in this process. The conditions require the preparation and Planning Secretary approval of 14 management plans, the majority prior to mining. These plans are assumed to be finalised in response to the consent conditions in undertaking this risk assessment. Similarly, a risk assessment was undertaken less than a year ago in developing the current (Care and Maintenance) MOP which will be replaced by this new MOP. The assessment made at that time is used in completing this risk assessment. The change driven by resuming mining operations is identified in this process.

The Management Plans in place at Russell Vale Colliery from the commencement of construction through to full operations include:

- Construction Management Plan (**MP09_0013**) 9/3/2021;

Management plans in place at Russell Vale Colliery for the commencement of mining operations second workings operations include:

- Air Quality & Green House Gas Management Plan (**MP09_0013**) 2021;
- Biodiversity Management Plan (**MP09_0013**) 2021;
- Conservation Management Plan (Version 1 dated 27/02/2013);
- Environmental Management Strategy (**MP09_0013**) 2021;
- Extraction Plan (LW 6 (365m) Version 2 dated 06/02/2015);
- Extraction Plan (RPPR, **MP09_0013**) 2021;
- Aboriginal Cultural Heritage Management Plan (**MP09_0013**) 2021;
- Heritage Management Plan (**MP09_0013**) 2021;
- Noise Management Plan (**MP09_0013**) 2021;
- Surface Facilities Water Management Plan (**MP09_0013**) 2021;
- Traffic Management Plan (**MP09_0013**) 2021;

- Visual Impact Management Plan (**MP09_0013**) 2021;
- Bushfire Management Plan (**MP09_0013**) 2021;
- Waste Management Plan (**MP09_0013**) 2021;
- Water Management Plan (**MP09_0013**) 2021; and
- Pollution Incident Response Management Plan (Version 1.5 dated 18/05/20).

Management plans in place at Russell Vale Colliery after the commencement of operations include:

- Adit Management Plan (**MP09_0013**) 2022 (Pending);
- Social Impact Management Plan (**MP09_0013**) 2021 (Pending).

The requirement for a Rehabilitation Management Plan is addressed through this new MOP.

Scoping meeting

The scope and method of the risk assessment was discussed between Wayne Sly (COO), Warwick Lidbury (RV Manager Mining Engineering) and David Moore (Health, Safety and Training Manager/RA facilitator) prior to the workshop. At this session, the scope, resources and workshop participants were agreed and confirmed.

The assessment team was assembled at WCL Russell Vale Colliery and undertook the assessment on Thursday 30 April 2021.

The work of the Risk Assessment Team

A key factor in the effectiveness of an exercise is the availability of relevant information and expertise. This is addressed mainly through the group workshop. Group workshops recruit the knowledge and experience of a group of people who are familiar with a particular work situation.

The role of team members is to provide their expertise, experience and technical knowledge, and to respect that provided by others. Outcomes are critically dependent on the team as a whole providing a balanced view at a level of expertise appropriate to the nature of the subject under Assessment. The experience and expertise of the team, together with the quality of facilitation, are crucial factors in the quality of the results derived.

3.11 Assessment team

Facilitator: Gary Dixon

Name	Role	Experience relevant to this risk assessment
Gary Dixon	Facilitator RA	35 years underground coal mining experience, qualified Deputy and Trainer/ assessor and EHS supervisor
Ratul Talukdar	Geologist	5 years' experience as a mining geologist, 5 – 8 years' experience in exploration geology in Queensland and NSW.
Robert Faddy-Vrouwe	Environmental Coordinator	Environmental Chemistry Degree, 5 years' experience at Wollongong Coal in the environmental department.
Wayne Sly	Chief Operating Officer	42 years industry experience, Bachelor of Engineering (Mining) Qld 1978, Mine Managers Competency NSW and QLD 1992.
Devendra Vyas	Tech Services Manager	25 years industry experience, Oversight of Environment Group, Approvals and Tech Services
Paul Evert	Logistics Manager	10 years' experience in logistics in coal haulage. 20 years' experience in rail industry management roles

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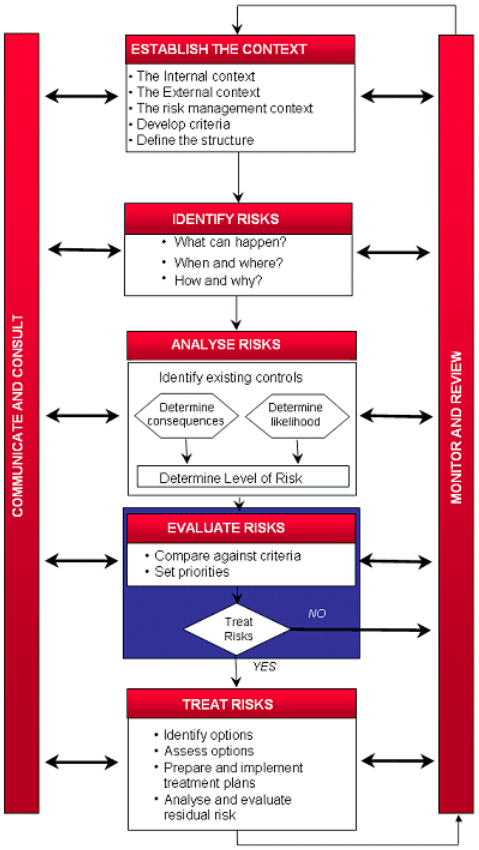

4. METHODOLOGY

The assessment was conducted in line with the requirements of the Australian Standard for Risk Management (AS/NZS ISO 31000:2009) and MDG 1010 Minerals industry safety & health risk management guideline (January 2011) while utilising the colliery's methodology in the identification, assessment and effective control of each of the recognised hazards and, included rating of likelihood and consequence of occurrence based on a combination of aspects including health and safety.

The resulting documented assessment of hazards, their rating, proposed controls and residual assessment were then circulated to all participants for comment to ensure all concerns raised were effectively addressed and controlled. Comments were discussed and the assessment amended as required. An action plan with specific responsibilities was then developed to ensure implementation of the identified controls.

5. ASSUMPTIONS AND REFERENCES

The following assumptions and limitations were applied to this risk assessment:

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- The site has an existing Mining Operations Plan (MOP) and will use this to review and develop the new Mining Operations Plan. This MOP will be the third in one year.
- All existing Management Plans, Systems and Procedures are available and understood.
- Existing Environmental Management Plans are being reviewed for compliance to relevant legislation and current site practices.

Compliance with the requirements of the:

- Work Health and Safety Act 2011 No.10,
- Work Health and Safety Regulation 2017,
- Work Health and Safety (Mines & Petroleum Sites)Act 2013 No.54,
- Work Health and Safety (Mines & Petroleum Sites)Regulation 2014,
- Work Health and Safety (Mines and Petroleum Sites) Amendment Regulation 2018,
- MDG 1010 Minerals industry safety & health risk management guideline (January 2011),
- MDG 1014 Guide to reviewing a risk assessment of mine equipment & operations (July 1997),
- Contaminated Land Management Act 1997 No.140,
- Crown Lands Management Act 2016 No.58,
- Dams Safety Act 2015 No.26,
- Dangerous Goods (Road and Rail Transport) Act 2008 No.95,
- Energy and Utilities Administration Act 1987 No.103,
- Environmental Planning and Assessment Act 1979 No.203,
- Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)
- Fisheries Management Act 1994 No.38,
- Heritage Act 1977 No.136,
- Mining Act 1992 No.29,
- Biosecurity Act 2015 No.24,
- Protection of the Environment Operations Act 1997 No.156,
- Road and Rail Transport (Dangerous Goods) Act 2008 No.95,
- Roads Transport Act 2013 No.18,
- Heavy Vehicle (Adoption of National Law) Amendment Act 2013 No.71,
- Water NSW Act 2015 No.74,
- Biodiversity Conservation Act 2016 No.63,
- Water Act 1912 No.44, and Water Management Act 2000

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6. DEFINITIONS

6.1 Hazard

The term "hazard" is defined as "a source of potential harm". The minerals industry has many large and sometimes complex hazards. Using this definition, electricity, large mobile equipment, ground and objects at height all have a potential for harm. This guideline, in conjunction with the NMIHSRAG, suggests that good risk management involves the identification and understanding of hazards, the establishment of potential unwanted events related to those hazards and, subsequently, the analysis of risk related to the unwanted event. Using this approach risk is a measure of concern; used to increase awareness, set priority or determine acceptability of an unwanted event risk.

Environment note: The term 'hazard' is essentially equivalent to 'environmental aspect'.

Establishing the context within the risk management process involves the overall direction setting and rationale for the entire process. AS/NZS ISO 31000:2009 includes consideration of external and internal factors in establishing context as well as the resultant goals, objectives and strategies including definition of risk acceptability criteria.

6.2 Incident (or ongoing condition)

An incident (or ongoing condition) is any occurrence that has the potential to result in adverse consequences to people, the environment, property/plant, or a combination of these.

6.3 Consequence

Consequences can result from the development of an incident over time (immediately after or over an extended period). The concept of consequence includes, within its scope, the potential adverse impacts/effects on people, the environment, plant or property, or a combination of these. By definition, consequence must be expressed as a quantitative between 1 and 5.

6.4 Impact/Effect

Impacts are specific adverse effects resulting from an incident and may be related to people, the environment, plant or property, or a combination of these.

6.5 Probability

Probability is an expression of the chance of a particular outcome. By definition, probability must be expressed as an alphabetical reference between A and E. Within this guideline the term probability is the qualitative description of likelihood and/or frequency in relation to the chance that something will occur & will be referenced as such in this risk assessment.

6.6 Frequency

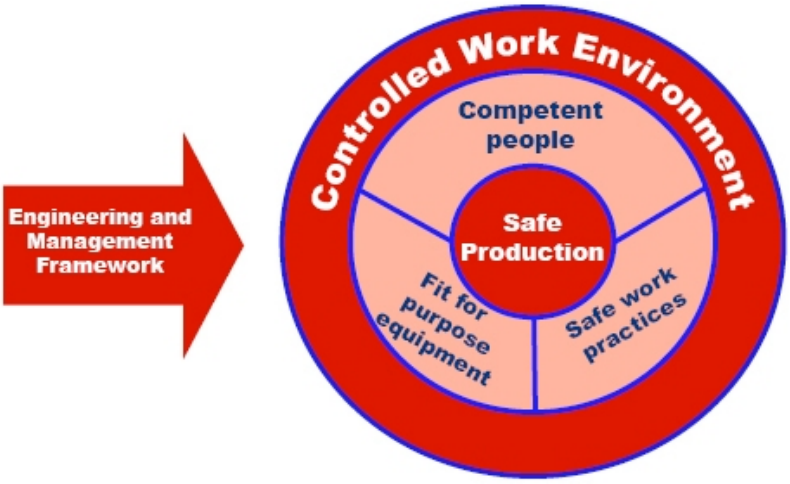
Frequency is defined as the number of times something (e.g.an activity, the hazard or incident) may occur within a specified timeframe, such as daily, weekly or annually. Within this guideline the frequency term is used in quantitative risk assessments.

6.7 Risk

Risk is defined as the likelihood of an impact on people, the environment, property, or a combination of these.

6.8 "Nertney Wheel"

The "Nertney Wheel" (Bullock, 1979), illustrated below, offers a model of an ideal work process for achieving safe production - the intended outcome of most site decisions. The wheel identifies four components of a safe and productive work process, competent people, safe work practices, fit for purpose equipment and a controlled environment.



Process Model or the Nertney Wheel

The term competent people is intended to not only refer to competency related to training and skills but also appropriate motivation and "fitness for duty".

6.9 The basic risk management process

The first step in understanding risk management involves becoming comfortable with the terminology and the intention of risk management. Obviously correct use of the word "risk", considering its definition, is important to successful risk management. Risk is defined as "effect of uncertainty on objectives" (AS/NZS ISO 31000:2009). This definition has evolved over the last 10 years, improving its clarity. AS/NZS ISO 31000:2009 also notes that "Risk is often characterized by reference to potential events and consequences or a combination of these". For the purposes of this guideline, the identification of an unwanted event will be separated from the term "risk". The term "risk" will be used to describe MDG 1010 – Risk Management Guideline Page 14 of 117 only the measure of event consequences and likelihood. Note that a risk is usually thought of in terms of negative impact but similar approaches can be used to identify positive events or opportunities. It is important to note that there is no "zero risk". A source may suggest that risks must be eliminated but unless the hazard is totally removed and no related hazard put in its place, elimination cannot be achieved. Risk is managed to a level of acceptability or practicality.

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Risk analysis is defined as a "process to comprehend the nature of risk and to determine the level of risk" (AS/NZS ISO 31000:2009). In other words, this is the step where likelihood and consequence are somehow estimated. Risk analysis is usually done considering the impact of existing controls though there are circumstances where estimating inherent risk, or risk without controls, is desirable.

AS/NZS ISO 31000:2009 defines risk assessment as the "overall process of risk identification, risk analysis and risk evaluation" as outlined above. In practice, most risk assessment involves the application of a variety of informal and formal, qualitative and quantitative methods to assist with the management of risk.

6.10 Common Mining Energies

Biological	bacteria, viruses, contagious diseases, natural poisons, etc.
Chemical	coal, gases, fuels, lubes, degreasers, solvents, paints, etc.
Electrical	high voltage, low voltage, batteries, etc.
Gravitational (objects)	falling coal, rock, tools, components, structures, etc.
Gravitational (people)	falling from or into equipment, structures, ladders, sumps, etc.
Machine (Fixed)	powered by electrical, hydraulic, pneumatic, combustion, etc.
Machine (Mobile)	haulage trucks, LHDs, service vehicles, gen sets, tools, etc.
Magnetic (	handling metal objects in strong magnetic fields),
Noise	from machines and other sources,
Object	pressurised systems, cylinders, springs, chains, flying bits, etc.
People	slip, trip, lift strain, push/pull sprain, repetitive /postural strain,
Thermal	conducted (contact), convected (airstreams), radiation,
Vibration	from vehicles, equipment, tools, etc.
Other	friction, wind, animal, bio-chemical.

6.11 Hierarchy of Controls

In occupational health and safety risk management there is a hierarchy of controls referred to as the Safety Precedence Sequence for Barriers/Controls. This lists the types of control and their effectiveness in descending order.

The most effective controls are those that eliminate the hazard. If a hazard cannot be eliminated it should be minimised to an acceptable level. This may be achieved through a system of engineering controls, often referred to as 'hard' barriers down to administrative controls usually referred to as 'soft' barriers. Hard barriers actually prevent or minimise the risk of contact with the hazard whereas soft barriers may rely on policies and procedures and their enforcement, training, skills and experience, work organisation and the wearing of personal protective equipment (PPE). These controls are primarily based on controlling human behaviour and are subject to human error. Therefore they may be less effective in preventing exposure to hazards. Nevertheless, there is a place for both hard and soft barriers in any risk management plan.

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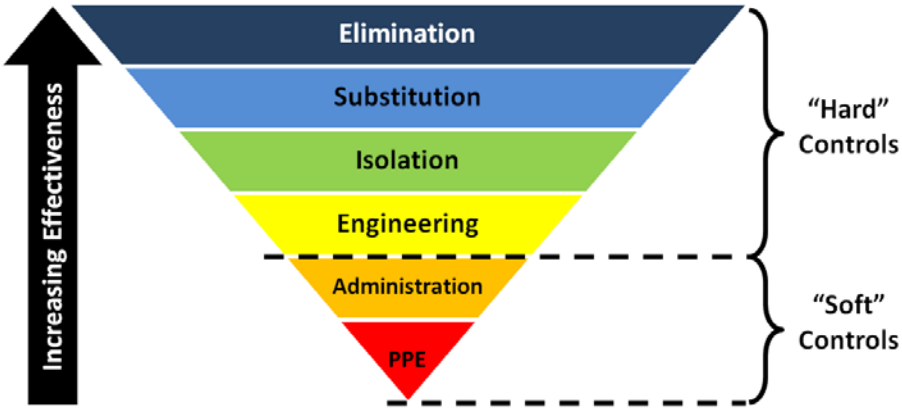

The effectiveness and place of each control on the 'hierarchy' is considered at all times when identifying and suggesting controls for hazards. Existing controls are considered and where necessary, additional controls are recommended.

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6.12 Risk acceptability

Risk acceptability and risk management is one of the most challenging concepts in risk management concerns the establishment of risk acceptability. There is no zero risk if a hazard is truly or potentially present. Risk must be managed to a level that is as low as reasonably practicable (ALARP).

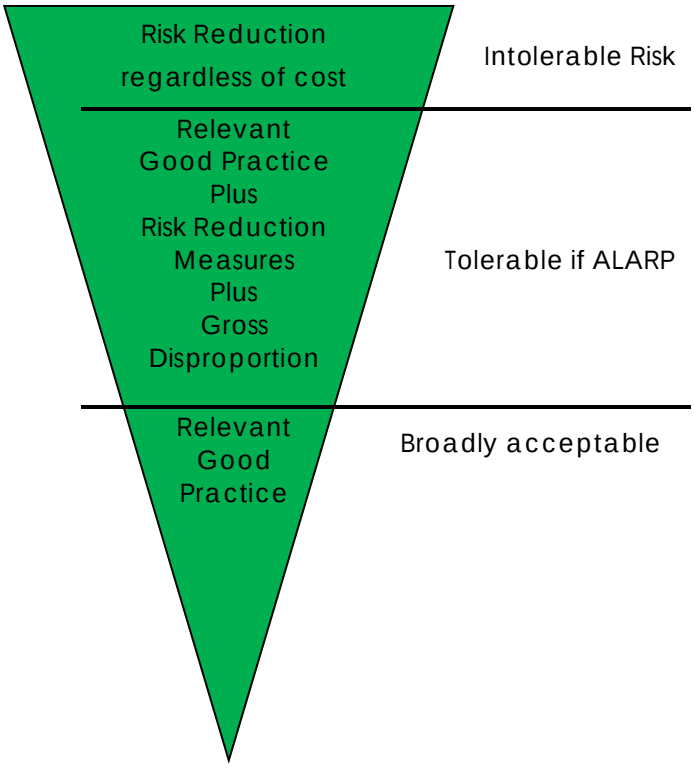

Diagram – Risk Acceptability

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7. RISK METHODOLOGY

Wollongong Coal Ltd Risk Methodology - (as reference).

Consequence Severity

-

	Consequence Definitions (Where a scenario has more than one 'Loss Type', choose the one with the maximum credible rating)				
Loss Type (Additional 'Loss Types' may exist for an event; identify and rate accordingly)	**1 Insignificant**	**2 Minor**	**3 Moderate**	**4 High**	**5 Major**
Harm to People Safety & Health (S/H)	First aid case / Exposure to minor health risk	Medical treatment case / Exposure to major health risk	Lost time injury / Reversible impact on health	Loss of quality of life / Irreversible impact on health	Single or multiple fatalities / Impact on health ultimately fatal
Environmental Impact (EI)	Negligible impacts such as small spill or leak immediately contained or recovered. One adverse local public complaint	Minor environmental harm such as large release of contaminant to land that is contained and readily recoverable using pumps or mobile plant. Recovery and clean up costs less than $5,000. Minor complaint from local resident/s likely easily rectified	Moderate, environmental harm e.g. release of contaminant into storm drain or soil causing deep or moderate contamination. Possible cumulative impact event such as nutrient/sediment runoff. Recovery /clean up and or legal costs up to $50,000. Numerous public complaints from community moderately difficulty address	Significant off-site release of contaminant to land/water/air. Difficult to recover and major environmental harm or potential harm expected e.g. fish kill, human health with recovery/ clean up /legal costs up to $250,000. Numerous ongoing public complaints / government lobbying difficult and costly to address	Uncontrolled release of toxic contaminant to land/water/air off-site with significant and long-term environmental harm. Clean up costs over $250,000. Widespread and serious public outcry/ government lobbying difficult and costly to address

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Business Interruption/ Damage and Other Losses (BI/MD)	No disruption to operation/ < $150k (effect NPBT)	Brief disruption to operation / $150k to $750k	Partial shutdown / $750k to $3m	Partial loss of operation / $3m to $5m	Substantial or total loss of operation / > $5m
Legal and Regulatory (L&R)	Low level legal issue	Minor legal issue; non-compliance and breaches of the law	Serious breach of law; investigation/report to authority, prosecution and/or moderate penalty possible	Major breach of the law; considerable prosecution and penalties	Very considerable penalties & prosecutions. Multiple law suits & jail terms
Impact on Reputation / Social / Community (R/S/C)	Slight impact - public awareness may exist but no public concern	Limited impact - local public concern	Considerable impact - regional public concern	State impact - state public concern	National impact - national public concern

7.1 Probability Chart

The probability that the consequence will occur or re occur.

Level	Descriptor	Description
A	**Almost Certain**	Expected to occur in most circumstances Multiple / 12 months (> 80% probability)
B	**Likely**	Will probably occur in most circumstances Once / 12 months (61% to 80% probability)
C	**Possible**	Might occur within 1-2 year time period Once / 12 months – 2 years (41% to 60% probability)
D	**Unlikely**	Could occur during specified time period Once / 12 months – 5 years (21% to 40% probability)
E	**Rare**	May only occur in exceptional circumstances Once > 5 years (20% probability)

7.2 Risk Matrix

	CONSEQUENCE				
	Insignificant	Minor	Moderate	High	Major
PROBABILITY	1	2	3	4	5
A Almost Certain	M11	S16	S20	E23	E25
B Likely	M7	M12	S17	E21	E24
C Possible	L4	M8	S13	S18	E22
D Unlikely	L2	L5	M9	S14	S19
E Rare	L1	L3	M6	M10	S15

Risk Ranking Legend

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7.3 Safety Standard to be achieved

Selection of controls to reduce risks are made with due regard to their reliability. That is, installing engineering modifications is a superior control to operator training, education or warning signs. Removing the hazard altogether is the most effective control of all.

In every case the effectiveness of the controls in place was considered and assessed by the team for adequacy. In this manner the Risk Control Effectiveness (RCE) was assessed by the team using the risk rank and potential consequences of each hazard to ensure that the controls bring the risk to an acceptable level as low as reasonably practicable (ALARP).

Risk Rating	Risk Level	Guidelines for Risk Rating Matrix
E21 to E25	**(E) – Extreme**	Eliminate, avoid, implement specific action plans/procedures to manage and monitor – elevate to Senior Management Team for consideration prior to activity – must include improvements to decrease level of risk
S13 to S20	**(S) – Significant**	Proactively manage with systems and approval of same by Senior Management Team – must include improvements to decrease level of risk
M6 to M12	**(M) – Medium**	Actively manage
L1 to L5	**(L) - Low**	Monitor and manage as appropriate

7.31 Table 1:

Risk Identification		Risk Analysis and Evaluation						Management Action Plan						
Risk Event	Causes (Direct & Contributing)	Preventative Controls Elim = Eliminate Sub = Substitute Iso = Isolate Eng = Engineering Adm = Administrative PPE = Personal Protective Equipment	Mitigating Controls	Justification of Consequence and Probability ratings	Residual Risk Rating			Tolerable	Action Plan			Residual Risk Rating		
					Cons	Prob	Rating		Action	Responsible Person	Due Date	Cons	Prob	Rating
Exploration	Environmental damage, poor roads and vehicle incidents, leaks, sediment erosion, impacts to flora and fauna.	WCL EC PLN 003 Traffic Management Plan WCL EC PRO 022 Surface Drilling Within WATER NSW Catchment WCL EC PRO 011 Drill Hole Sealing And Capping Procedure WCL EC PRO 016 Vegetation Clearing In Special Area Land (Managed By WaterNSW) Review of environmental factors document WCL EC TRN 001 Remote Work & Special Area Land (Managed by WaterNSW) Access Induction Assessment WCL EC FRM 003 WaterNSW Access for Works Permit WCL EC PRO 015 Special Area Land (Managed by WaterNSW) Access Procedure WCL EC PRO 017 Catchment Monitoring Biological Hygiene Control Procedure v2	WCL EC PLN 002 Incident Response MP for Surface Drilling (Water NSW) WCL EC PLN 001 Incident Response Management Plan Special Area Managed by WaterNSW RVC EC PLN 022 Pollution Incident Response Management Plan	During the recent MOP period an exploration program consisting of drilling 11 holes to gather data on coal quality, strata, gas and water was completed. This was a successful exercise and was supported by a positive relationship with WaterNSW. A second exploration program of a similar size will be undertaken in the period of this MOP. This will be executed in the same region of the Catchment as the previous program.	2	C	M 8	Yes						
Construction	Environmental damage, poor roads and vehicle incidents, leaks, sediment erosion, impacts to flora and fauna. Community impacts such as noise, dust traffic	WCL Construction Environmental Management Plan_MP09_0013	WCL EC STD 003 Spill Kit Standard WCL EC PRES 004 Spill Response Presentation RVC EC PLN 022 Pollution Incident	Construction activities will consist of Bellambi Creek Diversion (Order), Noise Mitigation Works and ancillary restart works (Development Consent) and Rejects Emplacement Area rehabilitation area (on adjacent WCC land). New Construction Environmental Management Plan approved 8/3/21	2	C	S1 3	Yes				2	C	S1 3

Risk Identification		Risk Analysis and Evaluation							Management Action Plan						
Risk Event	Causes (Direct & Contributing)	Preventative Controls	Mitigating Controls	Justification of Consequence and Probability ratings	Residual Risk Rating			Tolerable	Action Plan			Residual Risk Rating		
		Elim = Eliminate Sub = Substitute Iso = Isolate Eng = Engineering Adm = Administrative PPE = Personal Protective Equipment			Cons	Prob	Rating		Action	Responsible Person	Due Date	Cons	Prob	Rating
		WCL HS PLN 001 Contractor Management Plan WCL HS FRM 008 Specialised Contractor Pre Works-Checklist WCL HS PRO 002 WCL Contractor HST Requirements DPIE Order with controls to be implemented. RVC Traffic Management Plan MP09_0013	Response Management Plan											
Mining Operations	Dust, noise, water balance changes, materials handling, waste, water, ecological impacts	RVC Extraction Plan MP09_0013 WCL HS FRM 005 Change Management Approval RVC Air Quality & Green House Gas Management Plan MP09_0013 RVC Biodiversity Management Plan MP09_0013 Conservation Management Plan (Version 1 dated 27/02/2013); Environmental Management Strategy MP09_0013 Extraction Plan (LW 6 (365m) Version 2 dated 06/02/2015) RVC Extraction Plan (RPPR, MP09_0013) 2021 RVC Aboriginal Cultural Heritage Management Plan MP09_0013	Management Training Appointments Audits Work Orders External Stakeholders (e.g. RR)	Increase in activity on site. Mining activities commence during this MOP period under approval conditions granted by the Regulator.	3	D	M 9	Yes						

Risk Identification		Risk Analysis and Evaluation						Management Action Plan						
Risk Event	Causes (Direct & Contributing)	Preventative Controls	Mitigating Controls	Justification of Consequence and Probability ratings	Residual Risk Rating			Tolerable	Action Plan			Residual Risk Rating		
		Elim = Eliminate Sub = Substitute Iso = Isolate Eng = Engineering Adm = Administrative PPE = Personal Protective Equipment			Cons	Prob	Rating		Action	Responsible Person	Due Date	Cons	Prob	Rating
		RVC Heritage Management Plan MP09_0013 RVC Noise Management Plan MP09_0013 RVC Surface Facilities Water Management Plan MP09_0013 RVC Traffic Management Plan MP09_0013 RVC Visual Impact Management Plan MP09_0013 Bushfire Management Plan RVC Waste Management Plan MP09_0013 RVC Water Management Plan MP09_0013 RVC Pollution Incident Response Management Plan (Version 1.5 dated 18/05/20 RVC Adit Management Plan (MP09_0013) 2022 RVC Social Impact Management Plan (MP09_0013) 2021												
Rock Emplacement				No rock emplacement activities during the period of this MOP					Not Rated					

Risk Identification		Risk Analysis and Evaluation							Management Action Plan						
Risk Event	Causes (Direct & Contributing)	Preventative Controls	Mitigating Controls	Justification of Consequence and Probability ratings	Residual Risk Rating			Tolerable	Action Plan			Residual Risk Rating		
		Elim = Eliminate Sub = Substitute Iso = Isolate Eng = Engineering Adm = Administrative PPE = Personal Protective Equipment			Cons	Prob	Rating		Action	Responsible Person	Due Date	Cons	Prob	Rating
Processing Residues and Tailings	Spills on site and during transportation, truck noise.	RVC Noise Management Plan MP09_0013 RVC Surface Facilities Water Management Plan MP09_0013 RVC MIN STD 006 Transport rules RVC Traffic Management Plan MP09_0013	RVC Pollution Incident Response Management Plan (Version 1.5 dated 18/05/20	There will be processing of ROM material that will produce a reject material that would require emplacement underground during this MOP period. This will not commence until later in year 2, utilising a new purpose-built facility.	2	C	M 8	Yes						
Waste Management	Spills on site and during transportation, truck noise.	WCL HS PLN 001 Contractor Management Plan WCL HS FRM 008 Specialised Contractor Pre Works Checklist WCL HS PRO 002 WCL Contractor HST Requirements RVC MIN STD 006 Transport rules RVC Traffic Management Plan MP09_0013	WCL EC STD 003 Spill Kit Standard WCL EC PRES 004 Spill Response Presentation RVC EC PLN 022 Pollution Incident Response Management Plan	All general waste from both the surface and underground operations is collected in large portable skips and removed regularly from site to by licensed waste management contractors to a licensed waste disposal depot. Waste oil and oily water is collected from a waste oil tank and, if necessary, site holding pits or sumps and removed from site by authorised oil recycling/disposal contractors.	2	D	L5	Yes						
Decommissioning and Demolition Activities	Environmental damage, poor roads and vehicle incidents, leaks, sediment erosion, impacts to flora and fauna, trespassers (Public Safety)	RVC MIN STD 006 Transport rules WCL HS PLN 001 Contractor Management Plan WCL HS FRM 008 Specialised Contractor Pre Works Checklist WCL HS PRO 002 WCL Contractor HST Requirements	WCL EC STD 003 Spill Kit Standard WCL EC PRES 004 Spill Response Presentation RVC EC PLN 022 Pollution Incident Response Management Plan	Rehabilitate 1 and 2 shafts is and isolated and controlled site. Removal of redundant surface infrastructure is within the active site area at RV East.	2	D	L5	Yes						

Risk Identification		Risk Analysis and Evaluation						Management Action Plan						
Risk Event	Causes (Direct & Contributing)	Preventative Controls	Mitigating Controls	Justification of Consequence and Probability ratings	Residual Risk Rating			Tolerable	Action Plan			Residual Risk Rating		
		Elim = Eliminate Sub = Substitute Iso = Isolate Eng = Engineering Adm = Administrative PPE = Personal Protective Equipment			Cons	Prob	Rating		Action	Responsible Person	Due Date	Cons	Prob	Rating
Temporary Stabilisation	Environmental damage, poor roads and vehicle incidents, leaks, sediment erosion, impacts to flora and fauna, trespassers (Public Safety)	RVC EC PLN 015 Traffic Management Plan WCL HS PLN 001 Contractor Management Plan WCL HS FRM 008 Specialised Contractor Pre Works Checklist WCL HS PRO 002 WCL Contractor HST Requirements RVC MIN PLN 007 Stockpile Slope Stability Coal Handling Control Plan RVC EC PLN 019 Water Management Plan RVC EC PLN 014 Air Quality & GHG Management Plan	WCL EC STD 003 Spill Kit Standard WCL EC PRES 004 Spill Response Presentation RVC EC PLN 022 Pollution Incident Response Management Plan	There will be temporary stabilisation work undertaken in the stockpile and processing area over this MOP period. The intention of the work will be to prevent erosion or entrainment of residual carbonaceous materials. The stabilisation methods will involve either: • Coverage of exposed areas with topsoil and planting with grasses; • Regular application of a dust suppressant/binding material to maintain surface cohesion to resist erosion or wind entrainment.	2	D	L5	Yes						
Progressive Rehabilitation and Completion	Environmental damage, poor roads and vehicle incidents, leaks, sediment erosion, impacts to flora and fauna, trespassers (Public Safety)	RVC EC PLN 015 Traffic Management Plan WCL HS PLN 001 Contractor Management Plan WCL HS FRM 008 Specialised Contractor Pre Works Checklist WCL HS PRO 002 WCL Contractor HST Requirements RVC EC PLN 019 Water Management Plan RVC EC PLN 014 Air Quality & GHG Management Plan RVC EC PLN 020 Rehabilitation Management Plan	WCL EC STD 003 Spill Kit Standard WCL EC PRES 004 Spill Response Presentation RVC EC PLN 022 Pollution Incident Response Management Plan WCL EC PRO 002 Community Complaints & Enquiries Procedure	The inactive rejects emplacement area will be rehabilitated during the period of this MOP. While it is off the lease area, the adjacent area which will be subject to landform, flood mitigation and stabilisation treatment is on the lease area.	2	C	M 8	Yes						

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Risk Identification		Risk Analysis and Evaluation						Management Action Plan						
Risk Event	Causes (Direct & Contributing)	Preventative Controls	Mitigating Controls	Justification of Consequence and Probability ratings	Residual Risk Rating			Tolerable	Action Plan			Residual Risk Rating		
		Elim = Eliminate Sub = Substitute Iso = Isolate Eng = Engineering Adm = Administrative PPE = Personal Protective Equipment			Cons	Prob	Rating		Action	Responsible Person	Due Date	Cons	Prob	Rating
		Water carts Community Consultation Committee (CCC)												
Material Prone to Spontaneous Combustion	Oxidation of Coal	RVC MIN PHMP 009 Spontaneous Combustion	RVC MIN PLN 014 Emergency Response Control Plan	Whilst it is believed the low propensity for spontaneous combustion will similarly apply for the subject area, previous test results from other areas of the lease have shown Wongawilli seam coal as having a low propensity to self-heating. • No instances of spontaneous combustion have been recorded in the ninety-year life of Wongawilli Seam mines in the NSW Southern Coalfield; and • Periodic testing of core samples of the Wongawilli Seam has indicated that the roof section has a low to low-medium proneness to spontaneous combustion whilst the working section has a low-medium to medium proneness.	2	E	L3	Yes						
Material Prone to Generating Acid Mine Drainage				Acid Mine Drainage has not been identified and is not foreseen to be likely to occur in the future at the Russell Vale Colliery and therefore is not applicable to the MOP.					Not Rated					
Mine Subsidence	Extraction of coal in multi-seam environment	RVC EC PLN 003 Subsidence Monitoring Plan RVC EC PLN 012 DSC Contingency Plan RVC EC TAR 002 BFMP TARP (RMS) Extraction Plan (LW 6 (365m) Version 2 dated 06/02/2015) RVC Extraction Plan (RPPR, MP09_0013) 2021		The potential for subsidence impacts on natural and manmade features has been assessed for areas which may potentially be affected by mine subsidence with protection and monitoring measures being implemented through the Extraction Plan under the Development Consent.	2	C	M 8	Yes						

Risk Identification		Risk Analysis and Evaluation						Management Action Plan						
Risk Event	Causes (Direct & Contributing)	Preventative Controls	Mitigating Controls	Justification of Consequence and Probability ratings	Residual Risk Rating			Tolerable	Action Plan			Residual Risk Rating		
		Elim = Eliminate Sub = Substitute Iso = Isolate Eng = Engineering Adm = Administrative PPE = Personal Protective Equipment			Cons	Prob	Rating		Action	Responsible Person	Due Date	Cons	Prob	Rating
Erosion and Sediment Control - Russell Vale Colliery Pit Top	High rainfall events, breach of barriers	RVC EC PLN 018 Surface Facilities Water Management Plan Monthly environmental inspection work order. Erosion sediment controls (sedimentary fence, sand bags)		Permanent erosion and sediment control measures involve the use of a number of settlement structures. These include some smaller sumps that are cleaned out as required with the frequency depending largely on rainfall runoff. There are three larger earthen dams to the north and east of the coal stockpile area. An excavator is used to remove material from these dams as required.	2	C	M 8	Yes						
Erosion and Sediment Control - SMP and Catchment Lease Areas	High rainfall events, subsidence	RVC EC PLN 003 Subsidence Monitoring Plan		As part of Extraction Plan monitoring, Russell Vale Colliery conducts inspections for impacts above longwall and second workings extraction areas that may have been affected by mine subsidence. Areas inspected that may experience soil erosion due to mine subsidence are generally restricted to rock outcrops, steep slopes and cliff lines, unpaved roads or tracks, streams and general soil cracking. These areas are checked when undertaking the monitoring program and will continue until regulatory approval is received to cease the monitoring.	2	E	L3	Yes						
Soil Types and Suitability	Contamination of soil, dust generated, erosion, sediment	RVC EC PLN 020 Rehabilitation Management Plan		There will be disturbance of the soil at the Russell Vale Pit Top and potentially in the catchment areas during the MOP period. During the rehabilitation of the emplacement area, topsoil will be appropriately sourced and applied as required.	3	D	M 9	Yes	Perform a soil analysis and inspection prior to soil being used during rehabilitation	Robert Faddy-Vrouwe	Prior to rehabilitation work commencing	3	D	M 9
Flora - Russell Vale Colliery Pit Top	Lack of weed management, feral animals	RVC EC PLN 017 Biodiversity Management Plan		Regular inspection of weeds, particularly lantana, by the Illawarra District Noxious Weeds Authority (IDNWA) as well as chemical spraying and general vegetation maintenance will continue to be conducted at during this MOP period. Threatened flora will be managed in accordance with the approved Biodiversity Management Plan. Activities in historically disturbed areas of the pit top site have no potential effects on threatened aquatic or terrestrial vegetation as none have been identified close to these areas.	2	D	L5	Yes						

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Risk Identification		Risk Analysis and Evaluation							Management Action Plan						
Risk Event	Causes (Direct & Contributing)	Preventative Controls	Mitigating Controls	Justification of Consequence and Probability ratings	Residual Risk Rating			Tolerable	Action Plan			Residual Risk Rating		
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Flora - SMP and Catchment Lease Areas	Lack of weed management, feral animals, mobility of seeds due to human activities.	RVC EC PLN 017 Biodiversity Management Plan WCL EC PRO 016 Vegetation Clearing In Special Area Land (Managed By WaterNSW) Review of Environmental Factors Inspection of drilling sites prior to drilling APZ environmental management plan		Vegetation clearing around the firebreaks at the shaft and drilling sites involves management of regrowth areas only and doesn't impact on threatened species.	2	D	L3	Yes						
Fauna - Russell Vale Colliery Pit Top	Disturbance of habitat, impact of vehicles	RVC EC PLN 017 Biodiversity Management Plan RVC EC PLN 015 Traffic Management Plan		Threatened fauna will be managed in accordance with the approved Biodiversity Management Plan. Ongoing operations in historically disturbed areas of the site have no potential effects on threatened fauna habitat as none have been identified close to these areas.	2	D	L5	Yes						
Fauna - SMP and Catchment Lease Areas	Disturbance of habitat, impact of vehicles	RVC EC PLN 017 Biodiversity Management Plan WCL EC PRO 017 Catchment Monitoring Biological Hygiene Control Procedure RVC Extraction Plan (RPPR, MP09_0013) 2021		The planned mining activity that could impact threatened fauna species in the UEP mining area will be addressed under the Extraction Plan approved by the Planning Secretary.	2	D	L5	Yes						
Slopes and Slope Management	Erosion, design, high rain events, maintenance of slopes	RVC Extraction Plan (RPPR, MP09_0013) 2021 RVC MIN PLN 007 Stockpile Slope Stability Coal Handling Control Plan RVC EC PLN 009_Public Safety Management Plan		The planned extraction in the MOP period that could lead to slope instability is limited. Access to the previously extracted LW6 (365m) area is subject to WaterNSW access restrictions. With no four wheel drive tracks or fire trails directly beneath identified cliffs or steep slopes, it is unlikely there would be any issues of safety as a result of potential rock falls.	2	D	L5	Yes						

Risk Identification		Risk Analysis and Evaluation						Management Action Plan						
Risk Event	Causes (Direct & Contributing)	Preventative Controls	Mitigating Controls	Justification of Consequence and Probability ratings	Residual Risk Rating			Tolerable	Action Plan			Residual Risk Rating		
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Air Quality - Russell Vale Colliery Pit top	High wind events, poor maintenance of sprays, hot/dry weather conditions	RVC Air Quality & Green House Gas Management Plan MP09_0013 Water carts Sprays Community Consultation Committee (CCC)	WCL EC PRO 002 Community Complaints & Enquiries Procedure	The air quality will be monitored in accordance with approved Air Quality & Greenhouse Gas Management Plan. Dust control options for surface activities during this MOP period include: • Stabilising the coal stockpile and coal processing area: • Use of the stockpile water sprays system. This facility can be automatically activated according to pre-set wind speed and direction controls; • Use of a water truck to wet down areas such as the coal processing area; and • Covering stockpile area with dust suppressant material.	2	C	M 8	Yes						
Air Quality - SMP and Catchment Lease Areas	High wind events, hot/dry weather conditions	RVC Air Quality & Green House Gas Management Plan MP09_0013 WCL EC PRO 022 Surface Drilling Within WATER NSW Catchment WCL HS PLN 001 Contractor Management Plan WCL HS FRM 008 Specialised Contractor Pre Works Checklist WCL HS PRO 002 WCL Contractor HST Requirements		The only activities in the catchment during the MOP period that could create dust are related to EP inspections, maintenance activities, and the exploration program. The impacts from these activities are: • Particulate emissions from motor vehicles and other fuel powered machinery.	2	D	L5	Yes						
Surface Water - Russell Vale Colliery Pit top	High rainfall events, poor maintenance of drainage structures, contamination of water	RVC Surface Facilities Water Management Plan MP09_0013 RVC EC PRO 002 Guide for Operation of RVC Stormwater Control Dam Pumps RVC EC PRO 003 Operational Procedure for RVC Discharge Valve		A system of cut-off drains are established up-slope of the mine site facilities to capture stormwater run-off and divert it away from the operational areas of the mine site and into local watercourses. The clean water drains are generally grassed open channels. The system carries the water from above the mine site to discharge through areas of bushland and via unnamed watercourses into tributaries of Bellambi Gully, Towradgi Creek and Hicks Creek.	2	C	M 8	Yes						

Risk Identification		Risk Analysis and Evaluation							Management Action Plan						
Risk Event	Causes (Direct & Contributing)	Preventative Controls	Mitigating Controls	Justification of Consequence and Probability ratings	Residual Risk Rating			Tolerable	Action Plan			Residual Risk Rating		
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Surface Water - SMP and Catchment Lease Areas	High rainfall events	RVC Surface Facilities Water Management Plan MP09_0013 RVC Water Management Plan MP09_0013 WaterNSW deny access at 10mm of rain		Surface water quality monitoring is undertaken in the Russell Vale East area at a frequency outlined in the approved EP, or as agreed by regulatory authorities to determine the impacts on surface water quality from previous mining.	2	D	L5	Yes						
Ground Water - Russell Vale Colliery Pit top	High rainfall events, poor maintenance of pumps, inadequate inspections	RVC Water Management Plan MP09_0013 Work order system for pump maintenance		Groundwater is collected in pits/sumps underground and is recycled/transferred underground where possible. This water is primarily used for dust suppression transport roadways and conveyor systems. Groundwater that is discharged from the mine is pumped to the surface and flows into the Mine Dams for use underground and for stockpile sprays. The overflow discharges to the site's dirty water management system and eventually collects in the SWCD where it is pumped to the clarifier and finally through the LDP2 into Bellambi Gully Creek.	2	C	M 8	Yes						
Ground Water - SMP and Catchment Lease Areas	Subsidence	RVC Water Management Plan MP09_0013 RVC Extraction Plan (RPPR, MP09_0013) 2021		Ground Water monitoring is undertaken in catchment lease areas of Russell Vale Colliery on a regular basis and in accordance with EP requirements.	2	D	L5	Yes						
Contaminated Land - Russell Vale Colliery Pit top	Spills, lack of containment	Re-fuelling procedure RVC HS PLN 005 Hazardous Substances Bunding Inspections	WCL EC STD 003 Spill Kit Standard WCL EC PRES 004 Spill Response Presentation RVC EC PLN 022 Pollution Incident Response Management Plan	An assessment of potential site contamination has been undertaken in the past at Russell Vale Colliery. The report recommends further investigations and the development of a Remediation Action Plan prior to rehabilitation work at the end of mine life.	2	D	L5	Yes						

Risk Identification		Risk Analysis and Evaluation						Management Action Plan						
Risk Event	Causes (Direct & Contributing)	Preventative Controls	Mitigating Controls	Justification of Consequence and Probability ratings	Residual Risk Rating			Tolerable	Action Plan			Residual Risk Rating		
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Contaminated Land - SMP and Catchment Lease Areas	Spills, lack of containment	Hazardous materials plan Bunding Inspections WCL EC PRO 022 Surface Drilling Within WATER NSW Catchment WCL EC PRO 011 Drill Hole Sealing And Capping Procedure	WCL EC STD 003 Spill Kit Standard WCL EC PRES 004 Spill Response Presentation RVC EC PLN 022 Pollution Incident Response Management Plan	The only activities involving materials that could potentially contaminate land are: • The transport to the No.4 Shaft site of minor quantities of: • Diesel for the diesel tanks; • Cleaning chemicals for cleaning of ventilation shaft buildings and machinery; and • Herbicide. • Diesel in vehicles accessing the ventilation shaft sites. Herbicide is used to keep vegetation within the compound to a manageable level to reduce fire risk. The only risk in the EP areas involving materials that could potentially contaminate land are diesel fuel in vehicles accessing monitoring sites and drill rig sites.	2	D	L5	Yes						
Hazardous Materials	Spills, lack of containment, transporting	RVC HS PLN 005 Hazardous Substances SDS Register Chemwatch Specialist storage systems RVC MIN STD 006 Transport rules	WCL EC STD 003 Spill Kit Standard WCL EC PRES 004 Spill Response Presentation RVC EC PLN 022 Pollution Incident Response Management Plan	Diesel fuel is brought to site by fuel tankers. The fuel is stored on site in a double skinned 10,000 L tanks. This tank is situated in the workshop area and is bunded, with fire-fighting facilities in close proximity. Fuel is pumped from this main storage tank into smaller transportable containment vessels for use underground. Russell Vale Colliery maintains a register of Safety Data Sheets (SDS) for all chemicals used on site. Other dangerous goods kept at Russell Vale Colliery include compressed gases, flammable and combustible liquids, poisonous substances and corrosive substances, none of which exceed the acceptable holding limits.	2	D	L5	Yes						
Greenhouse Gases, Methane Drainage / Venting	Poor drilling standards, capping standards, variation in coal seam gas contents	RVC MIN PLN 004 Ventilation Control Plan RVC MIN PHMP 010 Outburst RVC Air Quality & Green House Gas Management Plan MP09_0013		A Ventilation Control Plan is in use at Russell Vale Colliery. The Ventilation Control Plan has the prime objectives of ensuring critical safety risks posed by gas emissions and other hazards related to ventilation at Russell Vale Colliery can be effectively controlled. The highest desorbable gas content recorded for the Wongawilli seam, from exploration samples is approximately 8m3/tonne (at 20°C, 101.3kpa).	1	D	L2	Yes						

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Risk Event	Causes (Direct & Contributing)	Preventative Controls	Mitigating Controls	Justification of Consequence and Probability ratings	Residual Risk Rating			Tolerable	Action Plan			Residual Risk Rating		
		Elim = Eliminate Sub = Substitute Iso = Isolate Eng = Engineering Adm = Administrative PPE = Personal Protective Equipment			Cons	Prob	Rating		Action	Responsible Person	Due Date	Cons	Prob	Rating
				The gas is generally composed of 70% Methane and 30% Carbon Dioxide.										
Blasting	Incorrect storage and usage of explosives	RVC MIN PLN 009 Explosives Control Plan WCL HS PLN 001 Contractor Management Plan WCL HS FRM 008 Specialised Contractor Pre Works Checklist WCL HS PRO 002 WCL Contractor HST Requirements		Small scale blasting (known as Shot Firing) occurs underground infrequently. Underground blasting activities will be undertaken during this MOP period as the need arises. WCL uses a licenced contractor to undertake this task as required	2	E	L3	Yes						
Noise - Russell Vale Colliery Pit top	Vehicle movements, starting and reversing vehicles, conveyors and fans noise, poor maintenance practices	RVC Noise Management Plan MP09_0013 RVC Traffic Management Plan MP09_0013 Operating hours Due diligence noise monitoring program Community Consultation Committee (CCC)	High earth bund wall with additional noise mitigation walls WCL EC PRO 002 Community Complaints & Enquiries Procedure	• Continuous unattended real time noise monitors with audio capture and real time alerts; • A 3 to 4 metre high earth bund surrounds the coal processing area. Additional sound walls and bund modifications were made to mitigate noise impcats on the community. • Truck drivers are directed to drive slowly and have regard for Russell Vale residents' amenity;	2	C	M 8	Yes						
Noise - SMP and Catchment Lease Areas		RVC EC PLN 013 Noise Management Plan		Due to the absence of potentially affected receivers in the EP area and in general catchment areas, noise is not an issue.					Not Rated					

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Risk Event	Causes (Direct & Contributing)	Preventative Controls	Mitigating Controls	Justification of Consequence and Probability ratings	Residual Risk Rating			Tolerable	Action Plan			Residual Risk Rating		
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Visual and Lighting - Russell Vale Colliery Pit top	Bright light			Light from Russell Vale Colliery is either directly or indirectly visible to the local community as well as to the regional community within the view shed. The site is visible to a large area of the northern Wollongong Local Government Area due to its location on the escarpment. A lighting audit has been undertaken for the site.	1	E	L1	Yes						
Visual and Lighting - EP and Catchment Lease Areas				The lights at ventilation shafts are only turned on when required. There is no need to manage visual impact or stray light in the catchment areas.					Not Rated					
Aboriginal and Cultural Heritage - Russell Vale Colliery Pit top	Disturbance of sites, lack of training and awareness	RVC Aboriginal Cultural Heritage Management Plan MP09_0013 RVC Heritage Management Plan MP09_0013 RVC EC PLN 023 Conservation Management Plan		The Russell Vale Colliery Pit Top is listed in the Wollongong LEP 2009 as South Bulli Colliery as having heritage significance.	2	D	L5	Yes						
Aboriginal and Cultural Heritage - EP and Catchment Lease Areas	Disturbance of sites, lack of training and awareness	RVC EC PLN 023 Conservation Management Plan RVC Aboriginal Cultural Heritage Management Plan MP09_0013 RVC Heritage Management Plan MP09_0013 WCL EC PRO 022 Surface Drilling Within WATER NSW Catchment		Aboriginal Heritage Monitoring is undertaken in mining and catchment lease areas of Russell Vale East, Cultural Heritage Sites	2	D	L5	Yes						

Risk Identification		Risk Analysis and Evaluation						Management Action Plan						
Risk Event	Causes (Direct & Contributing)	Preventative Controls	Mitigating Controls	Justification of Consequence and Probability ratings	Residual Risk Rating			Tolerable	Action Plan			Residual Risk Rating		
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Spontaneous combustion	Oxidation of coal	RVC MIN PHMP 009 Spontaneous Combustion	RVC MIN PLN 014 Emergency Response Control Plan	No instances of spontaneous combustion have been recorded at Russell Vale Colliery or in the 90 years of mining the Wongawilli Seam in the NSW Southern Coalfields.	1	E	L1	Yes						
Bushfire - Russell Vale Colliery Pit top	Dry vegetation, lightning, arson, ignition sources	RVC Bushfire Management Plan MP09_0013 RVC EC PLN 022_Pollution Incident Response Management Plan WCL EC PRO 016 Vegetation Clearing in Special Area Land (Managed by WaterNSW) Procedure APZ Clearance Procedure	RVC MIN PLN 014 Emergency Response Control Plan Emergency services	Ongoing clearing of undergrowth from around the general pit top operational areas will be undertaken during this MOP period to reduce the risk of bushfires affecting the operational areas of the mine surface. A firefighting water main is also provided on the mine site, which is boosted by a pressure pump, to provide the means to manually fight any bushfire that may threaten the site. A firebreak is maintained along the pit top access road to ensure the emergency evacuation route remains safe. The site has personnel trained in firefighting and has a large supply of readily available water and firefighting equipment on site.	4	C	S1 8	Yes	During periods of high bushfire risk, additional site inspections (fire risk and availability of firefighting equipment) are to be organised by the senior site official at the daily meeting.	Safety Manager - TBT	30/9/ 2021	4	D	S1 4
Bushfire - EP and Catchment Lease Areas	Dry vegetation, lightning, arson, ignition sources	RVC EC PLN 026 Bush Fire Management Plan (RV) RVC EC PLN 022_Pollution Incident Response Management Plan WCL EC PLN 001 Incident Response Management Plan Special Area Managed by WaterNSW WCL EC PRO 016 Vegetation Clearing in Special Area Land (Managed by WaterNSW) Procedure APZ Clearance Procedure APZ management Plan	RVC MIN PLN 014 Emergency Response Control Plan Emergency services	Firebreaks are cleared around the site perimeter fence line of the main ventilation shaft site provides an asset protection zone and catchment bushfire protection.	2	C	M 8	Yes						

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Risk Event	Causes (Direct & Contributing)	Preventative Controls	Mitigating Controls	Justification of Consequence and Probability ratings	Residual Risk Rating			Tolerable	Action Plan			Residual Risk Rating		
		Elim = Eliminate Sub = Substitute Iso = Isolate Eng = Engineering Adm = Administrative PPE = Personal Protective Equipment			Cons	Prob	Rating		Action	Responsible Person	Due Date	Cons	Prob	Rating
Post Mining Land Use - Regulatory Requirements	Regulatory requirements do not meet Post Mining Land Use.	RVC EC PLN 025 East 1 DSC Notification Area Closure Plan RVC EC PLN 020 Rehabilitation Management Plan		There are a number of rehabilitation activities identified for the period of this MOP including No.1 and 2 shaft, portal sealing of the eastern Bulli and Balgownie seam portal entries and the RVEA rehabilitation works.	3	D	M 9	Yes						
Post Mining Land Use - Mining Lease Requirements		RVC EC PLN 025 East 1 DSC Notification Area Closure Plan RVC EC PLN 020 Rehabilitation Management Plan			3	D	M 9	Yes						
Development Consent Requirements	Non-compliance with development consent requirements	RVC EC STD 001 Environmental Management Strategy Plans made under the above Compliance Tracking Program		The mine operates under an approval under the Environmental Approval act 1979. Approval requirements are independently audited every 3 years, last completed at the end of 2019.	2	C	M 8	Yes						
Environmental Protection Licence Requirements	Non-compliance with EPL 12040	RVC EC STD 001 Environmental Management Strategy Monitoring as per licence requirements		The EPA administers and regulates EPLs under the POEO Act. WCL holds EPL 12040 in relation to water quality and general environmental protection measures at the Russell Vale Colliery. There are no specific requirements in these Licences that relate to mine rehabilitation. These licences will be relinquished as part of the rehabilitation process. WCL will need to consult with EPA with regard to the cancellation of these EPLs.	2	C	M 8	Yes						

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Post-Mining Land Use Goal	Non-compliance with Post-Mining Land Use Goal	RVC EC PLN 025 East 1 DSC Notification Area Closure Plan		The preferred post mining land use for the Russell Vale Colliery site is to rehabilitate the majority of disturbed areas back to natural bushland in imitation of the surrounding environment and in compliance with Mining Lease and Wollongong LEP allocated zone objectives. If areas are not zoned for environmental protection works then dwellings will be the preferred allocated land-uses.	2	D	L5	Yes						

8. ACTION PLAN

Issue Hazard / Risk	Action	Safety / Production / Compliance	Responsibility	Department / Area	Due Date

9. REFERENCES

RVC Extraction Plan MP09_0013

WCL HS FRM 005 Change Management Approval

RVC Air Quality & Green House Gas Management Plan MP09_0013

RVC Biodiversity Management Plan MP09_0013

Conservation Management Plan (Version 1 dated 27/02/2013);

Environmental Management Strategy MP09_0013

Extraction Plan (LW 6 (365m) Version 2 dated 06/02/2015)

RVC Extraction Plan (RPPR, MP09_0013) 2021

RVC Aboriginal Cultural Heritage Management Plan MP09_0013

RVC Heritage Management Plan MP09_0013

RVC Noise Management Plan MP09_0013

RVC Surface Facilities Water Management Plan MP09_0013

RVC Traffic Management Plan MP09_0013

RVC Visual Impact Management Plan MP09_0013

RVC Bushfire Management Plan MP09_0013

RVC Waste Management Plan MP09_0013

RVC Water Management Plan MP09_0013

RVC Adit Management Plan (MP09_0013) 2022

RVC Social Impact Management Plan (MP09_0013) 2021

RVC EC PLN 003 Subsidence Monitoring Plan

RVC EC PLN 005 Heritage Management Plan

RVC EC PLN 006 Groundwater Management Plan

RVC EC PLN 009_Public Safety Management Plan

RVC EC PLN 010 Extraction Plan

RVC EC PLN 011 Coal Resource Recovery Plan

RVC EC PLN 012 DSC Contingency Plan

RVC EC PLN 013 Noise Management Plan

RVC EC PLN 014 Air Quality & GHG Management Plan

RVC EC PLN 015 Traffic Management Plan

RVC EC PLN 017 Biodiversity Management Plan

RVC EC PLN 018 Surface Facilities Water Management Plan

RVC EC PLN 019 Water Management Plan

RVC EC PLN 020 Rehabilitation Management Plan

RVC EC PLN 022 Pollution Incident Response Management Plan

RVC EC PLN 023 Conservation Management Plan

RVC EC PLN 025 East 1 DSC Notification Area Closure Plan

RVC EC PLN 026 Bush Fire Management Plan (RV)

RVC EC PRO 002 Guide for Operation of RVC Stormwater Control Dam Pumps

RVC EC PRO 003 Operational Procedure for RVC Discharge Valve

WCL EC PRO 011 Drill Hole Sealing And Capping Procedure

WCL EC PRO 016 Vegetation Clearing In Special Area Land (Managed By WaterNSW)

WCL EC PRO 022 Surface Drilling Within WATER NSW Catchment

RVC EC STD 001 Environmental Management Strategy

RVC EC TAR 002 BFMP TARP (RMS)

RVC HS PLN 005 Hazardous Substances

RVC MIN PHMP 003 Ground or Strata Failure

RVC MIN PHMP 009 Spontaneous Combustion

RVC MIN PHMP 010 Outburst

RVC MIN PLN 004 Ventilation Control Plan

RVC MIN PLN 007 Stockpile Slope Stability Coal Handling Control Plan

RVC MIN PLN 009 Explosives Control Plan

RVC MIN PLN 014 Emergency Response Control Plan

RVC MIN STD 006 Transport rules

RVC MIN STD 025 Fire Protection Standard (Underground Operations)

WCL EC FRM 003 WaterNSW Access for Works Permit

WCL EC PLN 001 Incident Response Management Plan Special Area Managed by WaterNSW

WCL EC PLN 002 Incident Response MP for Surface Drilling (Water NSW)

WCL EC PLN 003 Traffic Management Plan

WCL EC PRES 004 Spill Response Presentation

WCL EC PRO 002 Community Complaints & Enquiries Procedure

WCL EC PRO 015 Special Area Land (Managed by WaterNSW) Access Procedure

WCL EC PRO 016 Vegetation Clearing in Special Area Land (Managed by WaterNSW) Procedure

WCL EC PRO 017 Catchment Monitoring Biological Hygiene Control Procedure v2

WCL EC PRO 022 Surface Drilling Within WATER NSW Catchment

WCL EC STD 003 Spill Kit Standard

WCL EC TRN 001 Remote Work & Special Area Land (Managed by WaterNSW) Access Induction Assessment

WCL HS FRM 005 Change Management Approval

WCL HS FRM 008 Specialised Contractor Pre Works-Checklist

WCL HS PLN 001 Contractor Management Plan

WCL HS PRO 002 WCL Contractor HST Requirements

10. CONTROL AND REVISION HISTORY

PROPERTY	VALUE
Approved by	WCL Chief Operating Officer
Document Owner	Wayne Sly
Effective Date	15/5/21

Revisions

VERSION	DATE REVIEWED	REVIEW TEAM (CONSULTATION)	NATURE OF THE AMENDMENT
C&M MOP 2020 (Reference)	20/08/20	David Moore, Peter Roser, Dean Jamieson, Paul Briggs, Ratul Talukdar, Robert Faddy-Vrouwe, Justin Merdith, Sasa Cugalj, Wayne Sly, Eladio Perez, Paul Evert.	Risk Assessment – Care and Maintenance Period MOP
1	**30/4/21**	**Gary Dixon, Wayne Sly, Devendra Vyas, Ratul Talukdar, Rob Faddy Vrouwe, Paulk Evert**	**MOP under MP09_0013 - Mining Operations**

Appendix D - Rehabilitation Cost Estimate

RUSSELL VALE COLLIERY

Rehabilitation Cost Estimate Update
Summary Report

Prepared for:

Wollongong Coal Limited
7 Princes Highway,
Corrimal NSW 2513

SLR Ref: 630.12926-R01
Version No: -v1.0
October 2019

PREPARED BY

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Wollongong Coal Limited (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
630.12926-R01-v1.0	11 October 2019	Sam MacDonald / Nathan Archer	Nathan Archer / Ron Bush (WCL)	Nathan Archer

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1 Introduction

Wollongong Coal Limited (WCL) operates the Russell Vale Colliery in the Southern Coalfield of New South Wales (NSW). The mine is located at Russell Vale approximately 8 km north of Wollongong and 70 km south of Sydney, within the local government areas (LGAs) of Wollongong and Wollondilly in the Illawarra region of NSW.

The South Bulli Coal Mining Company commenced mining on the slopes of the Illawarra Escarpment at Russell Vale Colliery in the mid-19th Century.

Under MP 10_0046 the approval to undertake mining operations, defined as extraction, processing, handling and storage of coal on the site expired on 31 December 2015. As a result of delays in receiving approval for continued operations, Russell Vale has been placed on Care and Maintenance and the only activities currently undertaken on site involve:

- maintaining surface and underground infrastructure;
- ensuring underground workings remain in a safe condition; and
- site stabilisation works to minimise the likelihood of pollution events.

The Russell Vale Colliery will remain on Care and Maintenance until the Underground Extension Project (UEP) is approved.

In 2013, Russell Vale mine updated a Rehabilitation Cost Estimate (RCE) for the site and catchment area using the NSW government rehabilitation cost calculation tool. The RCE totalled approximately $7.5 M. A security is also held by the Water NSW. On 17 October 2018, the Resources Regulator notified WCL (Letter Reference: SF18/92094) that the assessed security deposit had been increased from $7,516,000 to $7,662,000.

SLR Consulting Limited (SLR) has been engaged to review and update the previous rehabilitation cost estimates using the latest version of the NSW Resource Regulator Rehabilitation Cost Estimate Tool. The update is required to be submitted to the Resources Regulator.

2 Project Methodology

The following methodology was used to develop the rehabilitation cost estimate:

- Review documents to identify rehabilitation requirements and commitments and planned rehabilitation methodology;
- Review the existing RCE (including both the Russell Vale and Catchment Area) to identify previously costed rehabilitation and closure activities;
- Undertake a site inspection (more detail provided in Section 1.3.2) to identify any changes at the site since the previous RCE was completed;
- Use site information, aerial photography and GIS to ascertain the areas, lengths and volumes required for each rehabilitation activity for inclusion in the RCE;
- Update the existing RCEs into the latest version of the RCE calculation tool; and
- Prepare a report outlining the process by which the cost estimation process was undertaken including all assumptions relevant to the decommissioning, rehabilitation and closure of the Russell Vale.

The cost model has been developed in the latest version of the Resources Regulator Rehabilitation Cost Estimate Tool referenced in the NSW Government ESG1: *Rehabilitation Cost Estimate Guidelines* (June 2017).

3 Site Visit and Meetings

A site visit was undertaken on 27 September 2019. During the site visit the following aspects which may affect the RCE were discussed with Group Environment and Approvals Manager and the Environmental Coordinator:

- Current rehabilitation status;
- Future rehabilitation works (and associated timings); and
- Future approvals.

Additionally, inspections were conducted at all areas relevant to the RCE including:

- The Russell Vale Pit Top Area including:
  - Laydown yards;
  - Hardstands;
  - Workshops and mine buildings;
  - Coal Processing and Handling Plant (CHPP);
  - Stockpile areas;
  - Reject Emplacement Area (REA);
  - Mine portals and ventilation shafts;
  - Conveyors; and
  - Dams and water management infrastructure.
- Ventilation shaft infrastructure within the Water NSW Area including:
  - Shaft 4 pit top area;
  - Shafts 1 and 2;
  - Shaft 3; and
  - Shaft 5.

4 Russell Vale Mine Domains

In order to develop the cost model the site was divided into a series of management "domains", which are designed to enable better focus on the rehabilitation treatment of like areas across the site. This considers factors such as location, type of disturbance, and the specific activities that would be required for rehabilitation.

The configurations of these domains are outlined in **Table 1** and are further demonstrated in the domain plan provided in **Figure 1** and **Figure 2**. Also presented in **Table 1** is where each domain has been included in the RCE workbook.

Table 1 Russell Vale Domains

Domain	Description	Total Area (ha)	RCE Sheet
1	Russell Vale Pit Top	52.8	Underground (Pit Top and REA)
2	Rejects Emplacement Area	7.6 (the area of the REA located within the ML boundary)	Underground (Pit Top and REA)
3	No 4 Shaft Pit Top and Magazine	5.7	Underground (Shaft 4)
4	Underground Mining area (No. 1, 2, 3 and 5 Shafts)	4,437.1	Underground (Shaft 1, 2, 3 & 5)
5	Surrounding Lands	2,071.3	Underground (Pit Top and REA)

4.1.1 Domain 1 – Russell Vale Pit Top

Domain 1 consists of the following key areas:

- Mine infrastructure area (surface facilities) – including first aid/training crib room, muster room, lower bathhouse, pump station, admin building, maintenance building, electrical infrastructure (i.e., switchyard, substations, etc.) and surface supported pipelines such as the fire water pipeline;
- Open portals and adits as presented in **Table 2** and **Appendix A**.
- Vent fans and support infrastructure – open and backfilled shafts;
- Coal handling plant – crusher, crusher platform, 600 tonne bin, concrete reclaim tunnel, concrete silo, thickener tanks, workshop, office, control room;
- ROM and product stockpiles – stacker, on-ground and elevated conveyors, reclaim tunnels etc; and
- Infrastructure corridors – roads and tracks, 33 kV power lines, truck wash, weighbridge, culverts.

Table 2 Open Portal Schedule

Site	Details & Identification	Condition	Status
3	Gibson's No. 3 Portal – Balgownie Seam – Circa 2003 – Thin Seam Mining	Open	Operational
5	Track Rd, Portal to No. 4 Shaft – Balgownie Seam	Open	Operational
10	Wonga Mains – C Heading RTV Portal – Wongawilli Seam	Open	Operational
13	Wonga Mains – A Heading Return Fan Portal – Wangawilli Seam	Open	Operational
17	Wonga Mains – B Heading Intake Conveyor Portal – Wongawilli Seam	Open	Operational
18	Adit – Balgownie Seam Intake Conveyor Portal to No.4 Shaft (No. 1 Seam)	Open	Operational
19	Adit – Balgownie Seam Intake Conveyor Portal to No. 2 Seam	Open	Abandoned

4.1.2 Domain 2 – Rejects Emplacement Area

Domain 2 consists of the following key areas:

- REA;
- Access roads; and
- Truck-fill point.

Only the area of the REA is located within the Russell Vale Mining Lease (ML) boundary has been included in the RCE. The balance of the REA not within the ML boundary is governed by a development consent issues by Wollongong Shire Council, including rehabilitation requirements and obligations.

4.1.3 Domain 3 – No. 4 Shaft Pit Top and Magazine

Domain 3 consists of:

- Infrastructure area – workshop, pump house, control room, bathhouse, main office, switchroom, water tank, underground diesel tank;
- Dams – greywater and blackwater treatment ponds, sludge dam, maturation pond, disused pond, collection dam, stormwater dam, irrigation dam, pipes;
- Magazine – building, fence, road; and
- Sealed areas – roads and tracks, car park, helipad.

4.1.4 Domain 4 – Underground Mining Area (No. 1, 2, 3 and 5 Shafts)

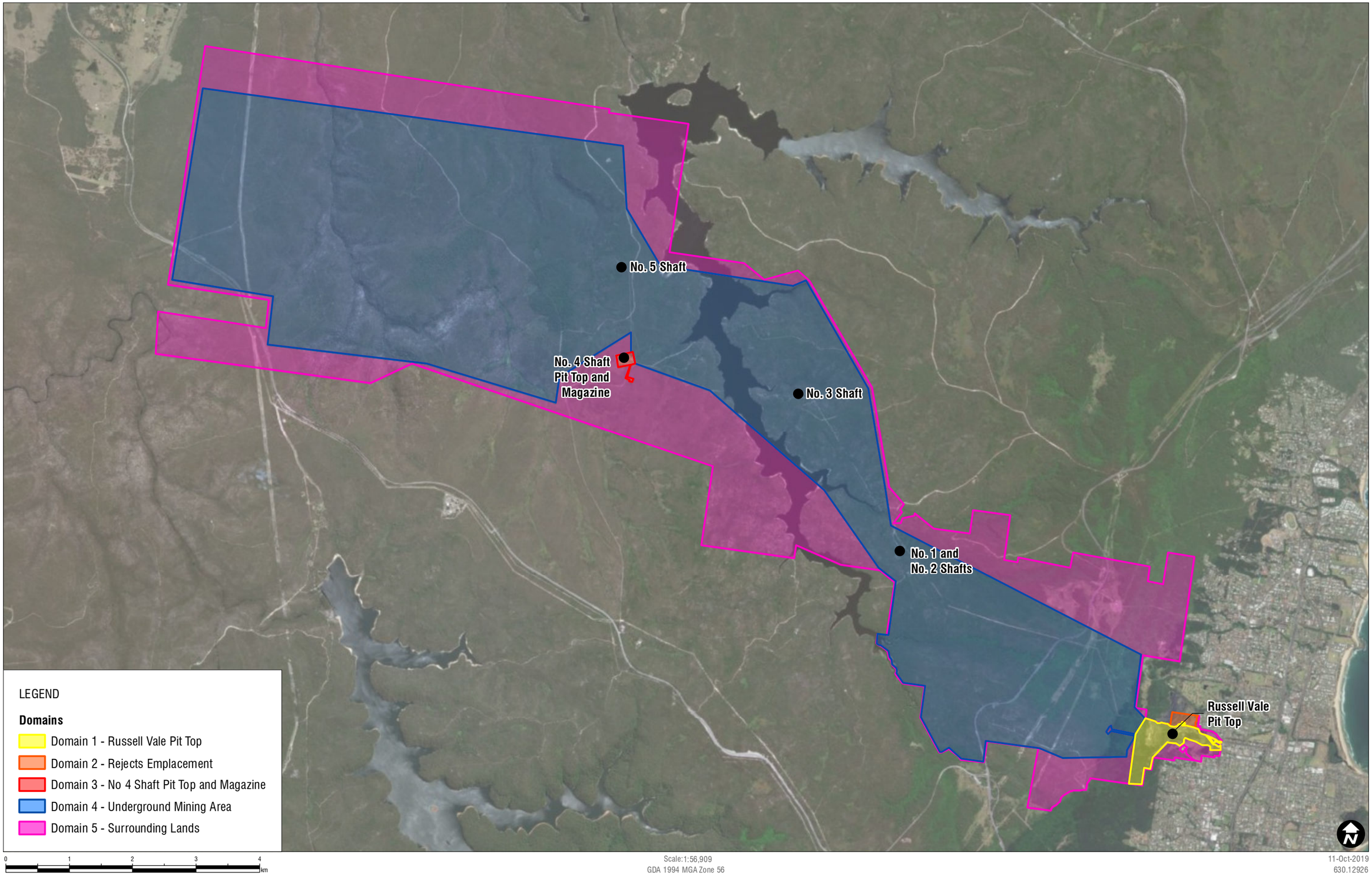
Domain 4 consists of:

- No 1 and No 2 shafts – switchyard, small buildings, small tank, vent fan and shafts;
- No 3 shaft – vent fan and shaft, road;
- No 5 shaft – surface pipelines, tank, vent fan and shaft, road; and
- Electrical transmission line and easement.

4.1.5 Domain 5 – Surrounding Lands (Lease Boundary)

Domain 5 consists of:

- Exploration areas – exploration and monitoring boreholes including piezometers;
- Roads and tracks – Russell Road;
- Dams – settling dams, storm water control dam, two turkeys nest dams along Russell Road, discharge weir, pit top dam, fire dam, 2 other dams near the underground mining area; and
- Drainage and diversions – pipes, creek diversion.



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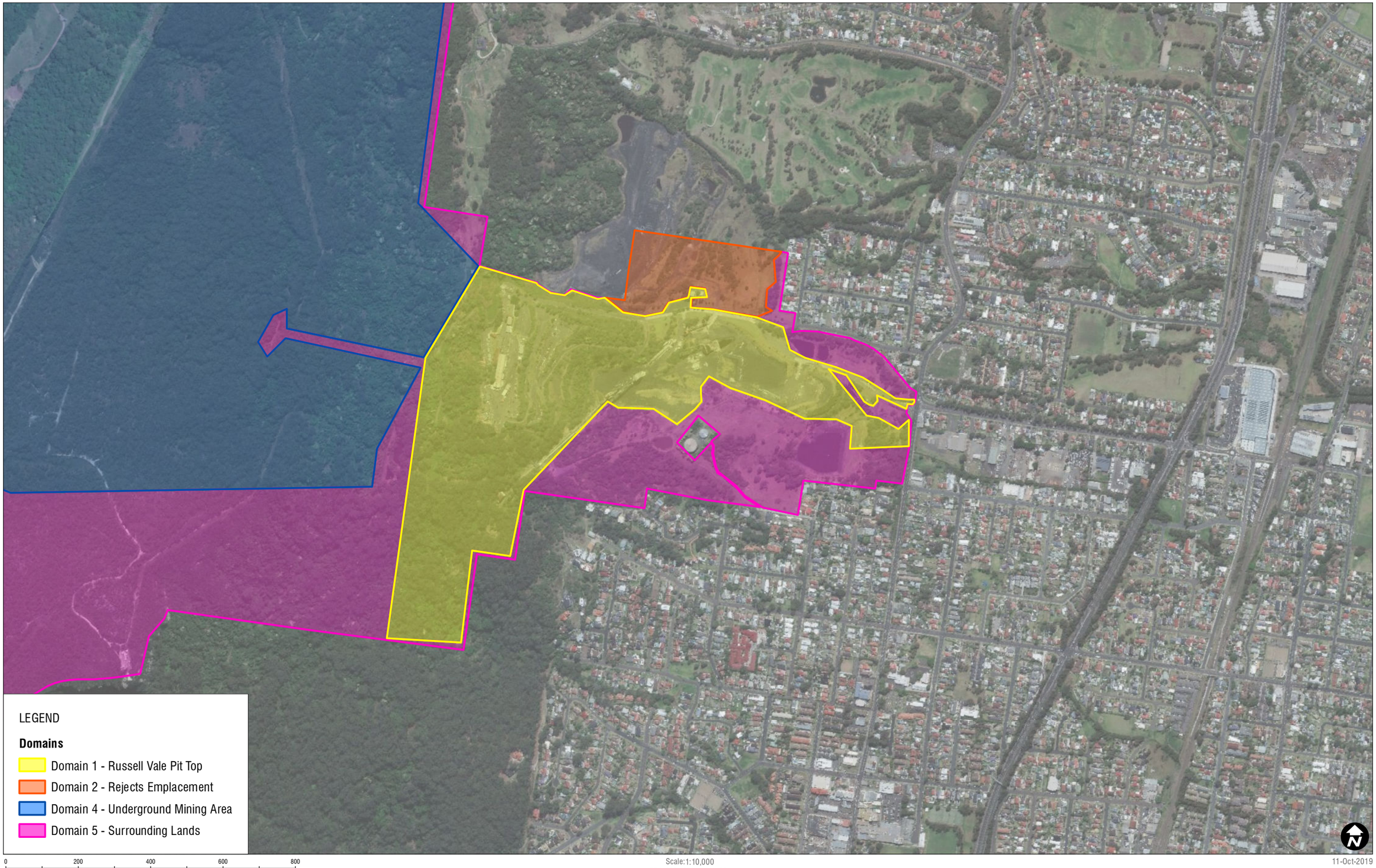
Russell Vale Domain Plan

FIGURE 1



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Russell Vale Domain Plan
Russell Vale Pit Top

FIGURE 2

5 Assumptions

The following assumptions were made in developing the Russell Vale RCE:

1. Post mining land uses will be as proposed within Section 4 of the Russell Vale Colliery Mining Operations Plan (MOP) dated August 2018.
2. No topsoil is required on the hardstand areas in the Russell Vale Pit Top which will be used for residential or other light commercial purposes post mining.
3. All shaft locations in the Water NSW area will be topsoiled and revegetated.
4. The access road to the No 4 shaft area will be retained for Water NSW use.
5. Rehabilitation of the part of the old switchyard that belongs to Integral Energy (servicing both the mine and the town) is not the liability of WCL.
6. Rehabilitation of the SCA tanks, bund and road is not the liability of WCL.
7. The conditions and status of portals and shafts has not changed substantially from the most recently reported surveillance and inspections (2012).
8. The open portals, adits and other items are as presented in **Table 2** and shown in WCL drawing WE10611 (attached as **Appendix A**).
9. Underground drainage pipes including the 1800 diameter pipe used to direct the creek under the site to the Stormwater Control Dam (SWCD) will be retained as part of the long term water management system.
10. The SWCD, discharge weir near Broker Street, Fire Dam, Pit Top Dam, and 2 dams near the Underground Mining Area will be retained post mining.
11. No subsidence rehabilitation is required for relinquishment.
12. WCL has no commitments or liability for the Cataract Reservoir dam wall.
13. Management of the REA will be transferred to the Wollongong City Council after rehabilitation.
14. Only the part of the REA located within the WCL mining leases has been included in this RCE.
15. It is understood that the consent requires that the REA is capped with 300mm of clay, 500mm of subsoil and 150mm of topsoil.
16. No dams on the Russell Vale site are plastic lined.
17. All infrastructure footings/concrete will be removed to 1 m below ground level.
18. All infrastructure is costed 'as is' unless otherwise noted.
19. All salvageable equipment and infrastructure underground will be removed before closure.
20. 0.5 m of stabilised material will be removed from hardstands and roads.
21. Stabilised material and bitumen will be disposed into the nearest portals and shafts.
22. Where required topsoil will be spread at 0.15 m.
23. In accordance with the RCE tool an additional 10% has been included for each of contingency, post closure environmental monitoring and project management and surveying.

6 Rehabilitation Cost Estimate

6.1 Rehabilitation Areas

Using the domain structure outlined, the required decommissioning, rehabilitation and closure related activities were identified to rehabilitate all disturbance. Areas, lengths and volumes have been determined through survey data, design drawings, and/or estimations made during the site inspection, and/or aerial/site photos with the assistance of spatial software (i.e., ArcGIS, CAD). The ArcGIS rehabilitation area figures for each key area are presented in **Appendix B** and include:

- **Appendix B1** - Domain 1 - Pit Top; Domain 2 – Reject Emplacement Area; Domain 5 – Surrounding Lands;
- **Appendix B2** – Domain 3 - No. 4 Shaft Pit Top and Magazine;
- **Appendix B3** – Domain 4 – Underground Mining Area (No. 1 and No. 2 Shafts);
- **Appendix B4** – Domain 4 – Underground Mining Area (No. 3 Shaft); and
- **Appendix B5** – Domain 4 – Underground Mining Area (No. 5 Shaft).

Appendix C presents the measured rehabilitation areas and lengths determined from ArcGIS and utilised in the RCE.

6.2 Rehabilitation Cost Estimate Summary

The complete RCE is attached as **Appendix D** and a summary of costs is provided in **Table 3**.

Table 3 2019 RCE Summary

RCE Tab	RCE Section	Domains Covered	Cost Estimate	Major cost items
Underground (Pit Top and REA)	1a Infrastructure	Domain 1 - Russell Vale Pit Top Domain 5 – Surrounding Lands	$5,553,590	Demolition of all pit top infrastructure Removal and disposal of carbonaceous material to the REA Sealing of open shafts, adits and portals Survey and remediation works for collapsed portals Sealing of boreholes
	2a Tailings and Rejects	Domain 2 - REA	$279,500	Capping and rehabilitation of REA
	4a Subsidence and Management	All domains	$1,043,062	Maintenance and monitoring of sealed shafts, adits and portals Restoration and maintenance of heritage listed portals Sundry items including development of closure plan and statutory requirements, site security during closure, HAZMAT clean up Mobilisation
Underground (Shaft 4)	1b Infrastructure	Domain 3 – No. 4 Shaft Pit Top and Magazine	$1,471,219	Demolition of Shaft 4 infrastructure Sealing of Shaft 4
	4b Subsidence and Management		$26,068	Maintenance and monitoring of sealed shaft Land management of undisturbed areas Additional mobilisation to remote sites
Underground (Shaft 1, 2, 3 & 5)	1c Infrastructure	Domain 4 - Underground Mining Area	$1,029,954	Demolition of Shaft 1, 2, 3 and 5 infrastructure Sealing of Shafts
	4c Subsidence and Management		$100,000	Maintenance and monitoring of sealed shafts Land management of undisturbed areas Additional mobilisation to remote sites
Subtotal		**All domains**	**$9,503,393**	**-**
Underground Summary Report	Contingency	All domains	$950,339	-
	Post Closure Environmental Monitoring	All domains	$950,339	-
	Project Management and Surveying	All domains	$950,339	-
Total		**All domains**	**$12,354,410**	**-**

6.3 Comparison to 2013 RCE

Given that the cost estimate has been prepared in the latest Resources Regulator RCE tool which has a different structure to the previous RCE; it is difficult to provide direct comparisons to individual domain costs in the previous cost estimates. Notwithstanding, **Table 3** presents a high level summary of cost difference to the previous 2013 RCE.

Table 4 Comparison of 2019 RCE with 2013 RCE

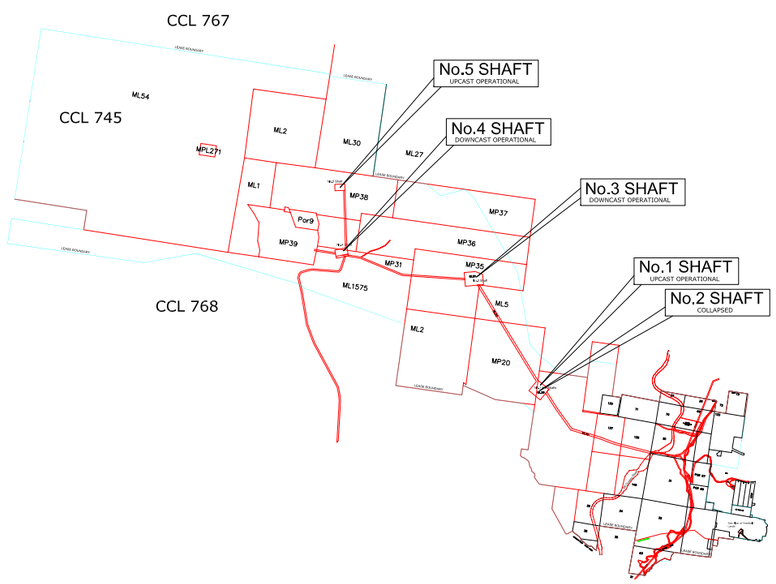
Item	2019 RCE Estimate	2013 RCE Estimate	Difference
Underground (Pit Top and REA)	$6,876,152	$3,081,186	$3,794,966
Underground (Shaft 4)	$1,497,287	-	-
Underground (Shaft 1, 2, 3 & 5)	$1,129,954	-	-
Total Catchment area (Shafts 1-5)	$2,627,241	$2,793,910	$-166,669
Subtotal	**$9,503,393**	**$5,875,096**	**$3,628,297**
Contingency	$950,339	$689,166	$261,173
Post Closure Environmental Monitoring	$950,339	$1,016,656	$884,023
Project Management and Surveying	$950,339		
Total	**$12,354,410**	**$7,580,918**	**$4,773,492**

APPENDIX A

Russell Vale Known Adits and Portals

SURFACE SHAFT POSITIONS

NOT TO SCALE



SYMBOLS

BULLI SEAM

BALGOWNIE SEAM

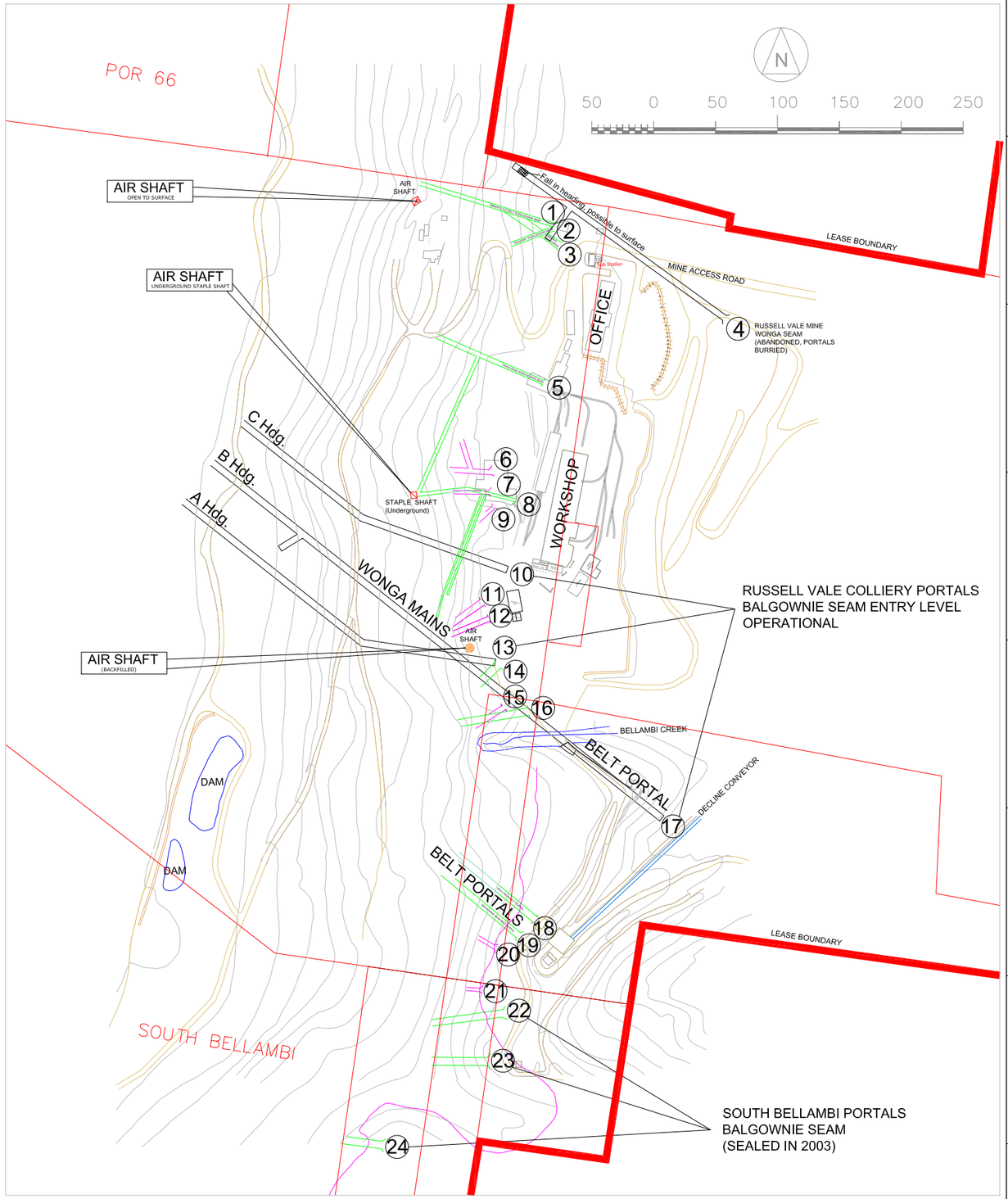
WONGAWILLI SEAM

UNDERGROUND BIN

SHAFT SITE

PORTAL SCHEDULE

SITE	DETAILS & IDENTIFICATION	CONDITION	STATUS
1	GIBSON"S No.1 PORTAL - OLD BELT ROAD - BALGOWNIE SEAM (HERITAGE LISTED).	SEALED	MAINTAINED
2	GIBSON"S No.2 PORTAL - BALGOWNIE SEAM (HERITAGE LISTED) - (GROUTED & SEALED).	SEALED	MAINTAINED
3	GIBSON"S No.3 PORTAL - BALGOWNIE SEAM - CIRCA 2003 - THIN SEAM MINING.	OPEN	OPERATIONAL
4	RUSSELL VALE MINE ENTRY - WONGAWILLI SEAM - CIRCA 1995 - ALLIED	BURIED	ABANDONED
5	TRACK RD. PORTAL TO No.4 SHAFT- BALGOWNIE SEAM.	OPEN	OPERATIONAL
6	BULLI SEAM CIRCA 1887 - (HERITAGE LISTED).	COLLAPSED	ABANDONED
7	THE 1887 ADIT - BULLI SEAM - (HERITAGE LISTED).	SEALED	MAINTAINED
8	ADIT - BALGOWNIE SEAM	COLLAPSED	ABANDONED
9	ADIT - BULLI SEAM	BACKFILLED	ABANDONED
10	WONGA MAINS - C HEADING RTV PORTAL - WONGAWILLI SEAM.	OPEN	OPERATIONAL
11	ADIT - BULLI SEAM	COLLAPSED	ABANDONED
12	ADIT - BULLI SEAM	COLLAPSED	ABANDONED
13	WONGA MAINS - A HEADING RETURN FAN PORTAL - WONGAWILLI SEAM.	OPEN	OPERATIONAL
14	ADIT - BALGOWNIE SEAM	SEALED	ABANDONED
15	ADIT - BULLI SEAM	COLLAPSED	ABANDONED
16	ADIT - BALGOWNIE SEAM	COLLAPSED	ABANDONED
17	WONGA MAINS - B HEADING INTAKE CONVEYOR PORTAL - WONGAWILLI SEAM.	OPEN	OPERATIONAL
18	ADIT - BALGOWNIE SEAM INTAKE CONVEYOR PORTAL TO No.4 SHAFT (No1. SEAM)	OPEN	OPERATIONAL
19	ADIT - BALGOWNIE SEAM INTAKE CONVEYOR PORTAL TO No.2 SEAM	OPEN	ABANDONED
20	ADIT - BULLI SEAM	COLLAPSED	ABANDONED
21	ADIT - BULLI SEAM	COLLAPSED	ABANDONED
22	SOUTH BELLAMBI MINE - BALGOWNIE SEAM	SEALED	ABANDONED
23	SOUTH BELLAMBI MINE - BALGOWNIE SEAM	SEALED	ABANDONED
24	SOUTH BELLAMBI MINE - BALGOWNIE SEAM	SEALED	ABANDONED



REV	DESCRIPTION	DATE	DRN	CKD	REV	DESCRIPTION	DATE	DRN	CKD

WOLLONGONG COAL

RUSSELL VALE COLLIERY

	Name	Date
DRN	GCH	05/05/2015
CKD		
APP		
SCALE	NTS	

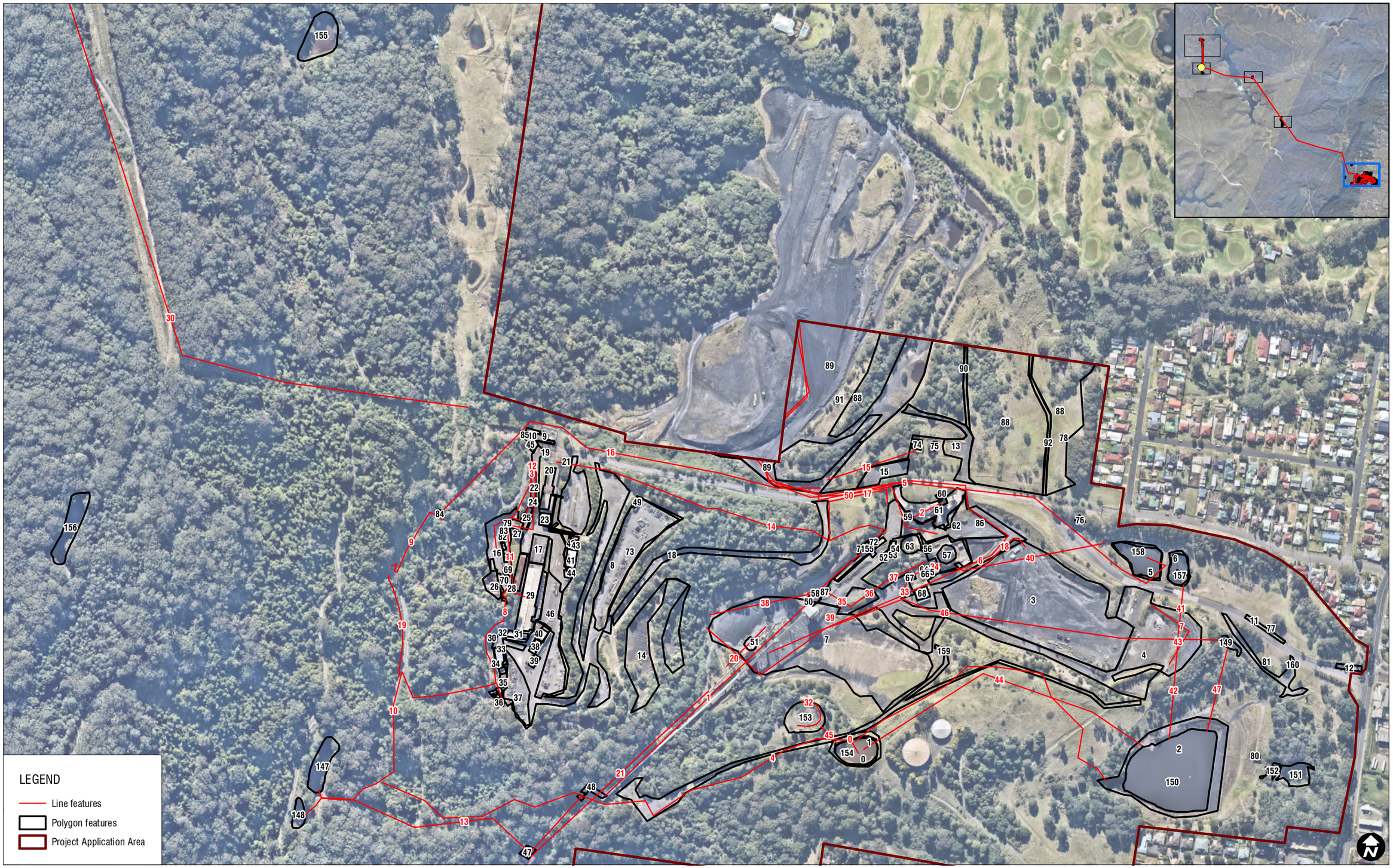
Title: Known Adits and Portals

DRAWING NUMBER: WE10611

REV

APPENDIX B

Russell Vale Rehabilitation Area Figures



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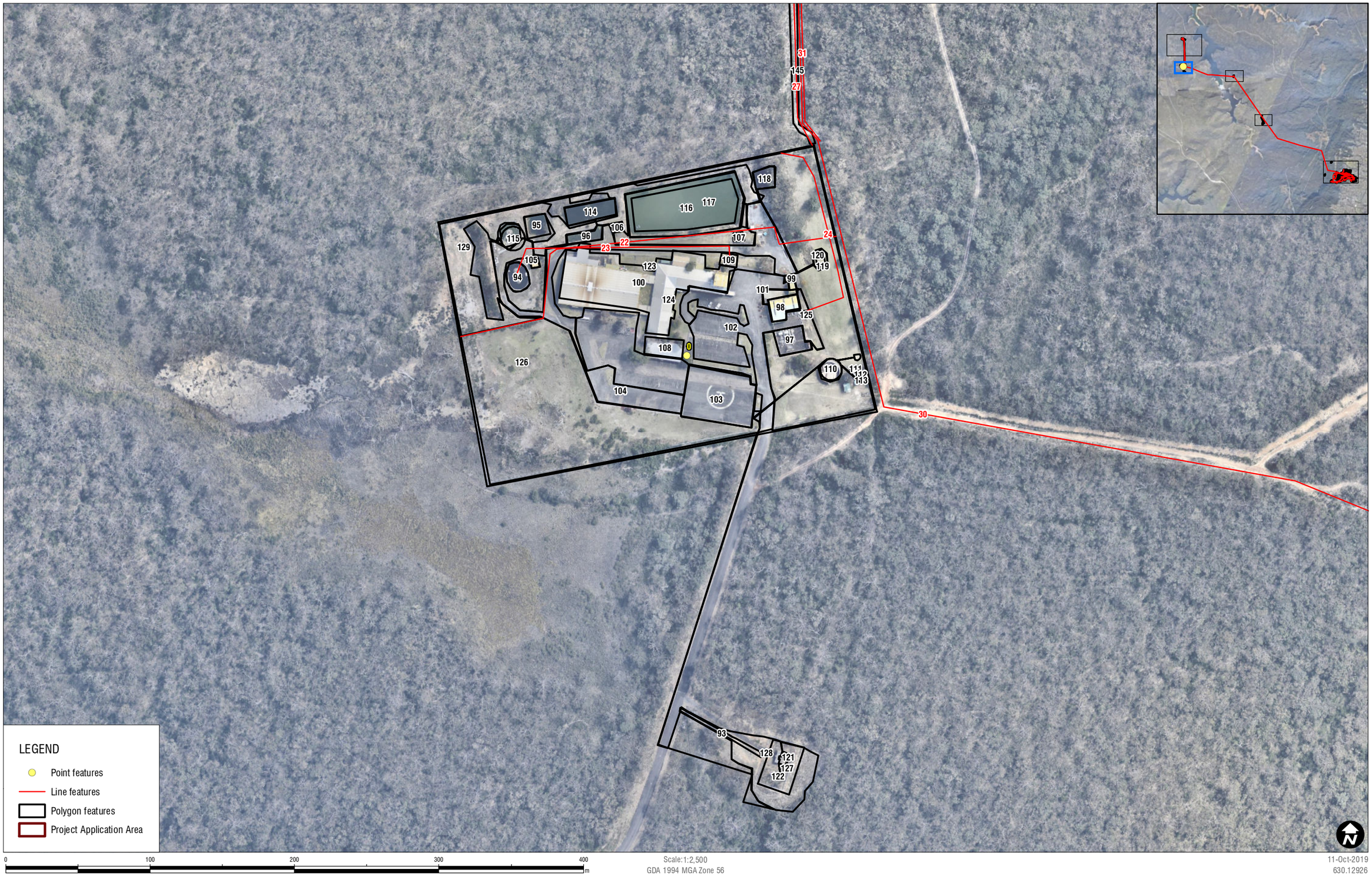
Domain 1 - Pit Top;
Domain 2 - Reject Emplacement Area;
Domain 5 - Surrounding Lands

Appendix B1



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Domain 3 - No. 4 Shaft Pit Top and Magazine

Appendix B2

0 100 200 300 400 m

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Domain 4 - Underground Mining Area
(No. 1 and No. 2 Shafts)

Appendix B3

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Domain 4 - Underground Mining Area
(No. 3 Shaft)

Appendix B4

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Domain 4 - Underground Mining Area
(No. 5 Shaft)

Appendix B5

APPENDIX C

Russell Vale Rehabilitation Measurements

FeatID	Name	FolderPath	Length (m)
0	Push distance Turkey's Nest	Domain 1 - RV Pit Top	27.8
1	Covered Conveyor 1	Domain 1 - RV Pit Top	391.2
2	Conveyor covered	Domain 1 - RV Pit Top	43.8
3	Dump stabilised material from switchyard	Domain 1 - RV Pit Top	265.9
4	Possible creek diversion channel	Domain 1 - RV Pit Top	1185.2
5	Settling Dam backfill haul	Domain 1 - RV Pit Top	877.7
6	Coal contam removal haul	Domain 1 - RV Pit Top	991.0
7	Bund to be reprofiled	Domain 1 - RV Pit Top	116.1
8	Pipeline supply x 2	Domain 1 - RV Pit Top	177.8
9	Fire water line pipelines 2	Domain 1 - RV Pit Top	137.6
10	Pipelines to ventilation shaft x 2	Domain 1 - RV Pit Top	458.2
11	firewater supply line x 2 to water tank	Domain 1 - RV Pit Top	152.5
12	Fire pipeline to hydrant	Domain 1 - RV Pit Top	52.8
13	Pipeline to CHPP x 2	Domain 1 - RV Pit Top	430.0
14	MIA to CHPP pipeline x 2	Domain 1 - RV Pit Top	613.9
15	Pipeline x1 to emplacement building	Domain 1 - RV Pit Top	127.9
16	Pipeline x 2	Domain 1 - RV Pit Top	583.5
17	Single pipeline	Domain 1 - RV Pit Top	151.8
18	Single pipeline	Domain 1 - RV Pit Top	76.5
19	Pipeline x 2	Domain 1 - RV Pit Top	141.7
20	Stacker rails	Domain 1 - RV Pit Top	75.2
21	Concreted conveyor length	Domain 1 - RV Pit Top	330.1
22	Internal pond fence	Domain 3 - No 4 Shaft Pit Top & Magazine	313.6
23	Haul of dam sediments to No 4 shaft for disposal	Domain 3 - No 4 Shaft Pit Top & Magazine	169.6
24	Buried cable	Domain 3 - No 4 Shaft Pit Top & Magazine	144.2
25	No 3 shaft fence b	Domain 4 - UG Mining Area	34.8
26	Tank	Domain 4 - UG Mining Area	6.9
27	No 5 shaft pipeline 1 from No 4 shaft	Domain 4 - UG Mining Area	1473.9
28	No 5 shaft pipeline 2 to tank	Domain 4 - UG Mining Area	126.5
29	No 5 shaft pipeline 3	Domain 4 - UG Mining Area	23.0
30	Electrical Transmission Line Easement	Domain 4 - UG Mining Area	12120.6
31	Easement already covered	Domain 4 - UG Mining Area	1266.6
32	Untitled Path	Domain 5 - Surrounding Lands	78.3
33	200 diameter	Domain 1 - RV Pit Top	31.3
34	200 diameter	Domain 1 - RV Pit Top	48.4
35	400 diameter	Domain 1 - RV Pit Top	37.1
36	400 diameter	Domain 1 - RV Pit Top	63.1
37	assumed 400 diameter	Domain 1 - RV Pit Top	56.4
38	450 diameter	Domain 1 - RV Pit Top	151.5
39	900 diameter	Domain 1 - RV Pit Top	10.9
40	1000 diameter	Domain 1 - RV Pit Top	206.3
41	assumed 1000 diameter	Domain 1 - RV Pit Top	71.4
42	assumed 1000 diameter	Domain 1 - RV Pit Top	132.1
43	assumed 1000 diameter	Domain 1 - RV Pit Top	8.4
44	assumed 1000 diameter	Domain 1 - RV Pit Top	431.6
45	assumed 1000 diameter	Domain 1 - RV Pit Top	32.1
46	1800 diameter pipeline	Domain 1 - RV Pit Top	757.7
47	1800 diameter pipeline	Domain 1 - RV Pit Top	116.5

FeatID	Name	Domain	Perimeter (m)	Area (m2)	ha	Area inside lease (m2)
0	Turkey's Nest Dam	Domain 1 - RV Pit Top	159.2	1738.9	0.2	
1	Turkey's Nest Dam Footprint	Domain 1 - RV Pit Top	191.7	2578.3	0.3	
2	Stormwater Catchment Dam	Domain 1 - RV Pit Top	513.9	15851.1	1.6	
3	Product Stockpile	Domain 1 - RV Pit Top	682.5	24758.8	2.5	
4	Vehicle Park Up Hardstand	Domain 1 - RV Pit Top	1119.4	13594.1	1.4	
5	Settling Pond 1	Domain 1 - RV Pit Top	201.4	2226.5	0.2	
6	Settling Pond 2	Domain 1 - RV Pit Top	128.2	1092.0	0.1	
7	ROM	Domain 1 - RV Pit Top	758.3	24850.6	2.5	
8	Main Infrastructure Area bitumen (incl. lower car park)	Domain 1 - RV Pit Top	3113.2	30089.7	3.0	
9	WCL Switchyard	Domain 1 - RV Pit Top	75.4	187.0	0.0	
10	WCL Switchyard concrete	Domain 1 - RV Pit Top	140.1	607.6	0.1	
11	Truck wash	Domain 1 - RV Pit Top	137.2	291.5	0.0	
12	Weighbridge	Domain 1 - RV Pit Top	84.0	250.2	0.0	
13	Road to emplacement	Domain 1 - RV Pit Top	421.9	2108.1	0.2	
14	Bare Benches	Domain 1 - RV Pit Top	745.9	6554.4	0.7	
15	Parking Area near emplacement (bitumen)	Domain 1 - RV Pit Top	186.0	1353.5	0.1	
16	Stabilised material 1 (gravel)	Domain 1 - RV Pit Top	336.8	2922.0	0.3	
17	Storage yard fuelling area next to Maintenance Building	Domain 1 - RV Pit Top	119.9	826.1	0.1	
18	Haul Road	Domain 1 - RV Pit Top	841.6	3808.4	0.4	
19	Substation 002 Switch Room	Domain 1 - RV Pit Top	30.3	54.3	0.0	
20	Administration	Domain 1 - RV Pit Top	147.2	691.7	0.1	
21	Building substation	Domain 1 - RV Pit Top	20.4	26.0	0.0	
22	Visitor's Parking Shed	Domain 1 - RV Pit Top	50.9	118.7	0.0	
23	Bathhouse demountable (2 storey)	Domain 1 - RV Pit Top	61.3	233.5	0.0	
24	Fire Equipment Storage	Domain 1 - RV Pit Top	25.4	32.8	0.0	
25	First Aid/Training Crib Room	Domain 1 - RV Pit Top/First Aid	81.6	256.1	0.0	
26	1887 Archway Building and Infrastructure	Domain 1 - RV Pit Top	139.1	773.6	0.1	
27	Gas shed	Domain 1 - RV Pit Top	18.4	19.4	0.0	
28	Storage shed next to Maintenance	Domain 1 - RV Pit Top	123.2	543.8	0.1	
29	Maintenance Workshop/Store	Domain 1 - RV Pit Top/Mainten	242.6	2002.5	0.2	
30	Shed	Domain 1 - RV Pit Top	20.9	25.9	0.0	
31	Muster Room demountable	Domain 1 - RV Pit Top	74.3	213.9	0.0	
32	Fire Station	Domain 1 - RV Pit Top	23.7	30.8	0.0	
33	Compressor House and Electrical Switchroom	Domain 1 - RV Pit Top	79.1	297.4	0.0	
34	Concrete Compressor house	Domain 1 - RV Pit Top	101.9	468.1	0.0	
35	Sheds	Domain 1 - RV Pit Top	32.1	33.1	0.0	
36	Vent fans	Domain 1 - RV Pit Top	128.2	216.2	0.0	
37	Contaminated area near vent fans	Domain 1 - RV Pit Top	326.6	2285.9	0.2	
38	Electrical spares demountable shed	Domain 1 - RV Pit Top	56.6	178.3	0.0	
39	Containers near Electrical spares	Domain 1 - RV Pit Top	50.5	143.0	0.0	
40	Mechanical spares demountable shed	Domain 1 - RV Pit Top	53.9	179.2	0.0	
41	Building near maintenance	Domain 1 - RV Pit Top	92.4	388.7	0.0	
42	Tank	Domain 1 - RV Pit Top	12.9	12.2	0.0	
43	Plastic Tank	Domain 1 - RV Pit Top	10.1	7.3	0.0	
44	Concrete 2	Domain 1 - RV Pit Top	442.5	812.4	0.1	
45	Shed	Domain 1 - RV Pit Top	29.6	45.7	0.0	
46	Laydown/Storage area contaminated	Domain 1 - RV Pit Top/Laydown	515.5	4166.2	0.4	
47	Old conveyor shed	Domain 1 - RV Pit Top	59.8	218.0	0.0	
48	New conveyor shed	Domain 1 - RV Pit Top	123.9	296.2	0.0	
49	Shed in Laydown yard	Domain 1 - RV Pit Top	45.2	76.3	0.0	
50	Crusher	Domain 1 - RV Pit Top	57.1	202.7	0.0	
51	Stacker	Domain 1 - RV Pit Top	54.2	214.3	0.0	
52	Shed	Domain 1 - RV Pit Top	32.3	61.0	0.0	
53	Shed	Domain 1 - RV Pit Top	17.2	18.4	0.0	
54	Control room	Domain 1 - RV Pit Top	47.0	122.8	0.0	
55	Reclaim area - concrete construction	Domain 1 - RV Pit Top	218.5	747.5	0.1	
56	Tank	Domain 1 - RV Pit Top	38.1	107.6	0.0	
57	Thickener	Domain 1 - RV Pit Top	78.5	469.3	0.0	
58	Reclaim tunnel	Domain 1 - RV Pit Top	22.4	21.9	0.0	
59	600 T silo/bin near roadway	Domain 1 - RV Pit Top/600 T silo	34.8	88.4	0.0	
60	Hopper	Domain 1 - RV Pit Top	62.4	146.2	0.0	
61	Concrete area by hopper for truck access	Domain 1 - RV Pit Top	331.5	2373.4	0.2	
62	Carbonaceous material clean up	Domain 1 - RV Pit Top	452.0	3828.4	0.4	
63	Concrete thickener base	Domain 1 - RV Pit Top	290.1	2622.3	0.3	
64	Plastic Tank	Domain 1 - RV Pit Top	12.7	10.3	0.0	
65	Building 1 near workshop 1	Domain 1 - RV Pit Top	34.4	71.2	0.0	
66	Building 2 near Workshop 1	Domain 1 - RV Pit Top	15.2	14.1	0.0	
67	Workshop 1	Domain 1 - RV Pit Top	33.1	59.4	0.0	
68	Workshop 2	Domain 1 - RV Pit Top	66.2	270.9	0.0	
69	Demountable	Domain 1 - RV Pit Top	33.5	60.4	0.0	
70	Demountable	Domain 1 - RV Pit Top	30.4	48.4	0.0	
71	Demountable	Domain 1 - RV Pit Top	43.3	90.5	0.0	
72	Shed - brick	Domain 1 - RV Pit Top	19.2	22.2	0.0	
73	Laydown Area below car park	Domain 1 - RV Pit Top	467.5	6703.3	0.7	
74	2 storey small building	Domain 1 - RV Pit Top	51.9	167.5	0.0	
75	Demountable	Domain 1 - RV Pit Top	34.5	68.5	0.0	
76	Demountable	Domain 1 - RV Pit Top	42.1	71.9	0.0	
77	Security building	Domain 1 - RV Pit Top	18.9	22.1	0.0	
78	Monitoring station	Domain 1 - RV Pit Top	24.9	33.9	0.0	
79	Operations (2 storey medium)	Domain 1 - RV Pit Top	61.9	236.3	0.0	
80	Small building near SWCD	Domain 1 - RV Pit Top	34.2	60.8	0.0	
81	Shed	Domain 1 - RV Pit Top	19.9	23.3	0.0	
82	New Substations	Domain 1 - RV Pit Top	100.5	39.7	0.0	
83	Demountable near new switchyard	Domain 1 - RV Pit Top	31.1	44.0	0.0	

FeatID	Name	Domain	Perimeter (m)	Area (m2)	ha	Area inside lease (m2)
84	Small building	Domain 1 - RV Pit Top	26.2	47.9	0.0	
85	3 walled building, no roof	Domain 1 - RV Pit Top	33.6	66.3	0.0	
86	CHPP footprint carbonaceous material	Domain 1 - RV Pit Top	1669.6	14784.8	1.5	
87	Sump	Domain 1 - RV Pit Top	43.4	55.8	0.0	
88	Emplacement including Rehab (excludes roads)	Domain 2 - Rejects Emplacemer	3661.1	219563.6	22.0	72149.0
89	Emplacement - final trim area	Domain 2 - Rejects Emplacemer	3067.3	145610.5	14.6	28034.7
90	Emplacement East Road	Domain 2 - Rejects Emplacemer	485.3	1081.2	0.1	536.8
91	Emplacement - fence	Domain 2 - Rejects Emplacemer	1962.7	151592.0	15.2	32532.2
92	Lower Emplacement Road	Domain 2 - Rejects Emplacemer	560.1	1552.2	0.2	853.3
93	Magazine Road	Domain 3 - No 4 Shaft Pit Top &	134.1	149.4	0.0	
94	Greywater Treatment Pond	Domain 3 - No 4 Shaft Pit Top &	58.3	254.6	0.0	
95	Sludge Dam	Domain 3 - No 4 Shaft Pit Top &	60.6	228.8	0.0	
96	Disused Pond	Domain 3 - No 4 Shaft Pit Top &	67.0	171.9	0.0	
97	Substation and transformer yard	Domain 3 - No 4 Shaft Pit Top &	81.6	367.6	0.0	
98	Workshop and switchroom	Domain 3 - No 4 Shaft Pit Top &	72.1	265.8	0.0	
99	Small buildings - fire, diesel storage	Domain 3 - No 4 Shaft Pit Top &	35.2	59.5	0.0	
100	Bathhouse and Main Office	Domain 3 - No 4 Shaft Pit Top &	381.8	3723.4	0.4	
101	Additional concrete	Domain 3 - No 4 Shaft Pit Top &	66.5	139.7	0.0	
102	Bitumen carparks, roads	Domain 3 - No 4 Shaft Pit Top &	1103.0	6424.5	0.6	
103	Helipad	Domain 3 - No 4 Shaft Pit Top &	166.1	1679.0	0.2	
104	Domain 3 Stabilised material	Domain 3 - No 4 Shaft Pit Top &	994.2	3702.2	0.4	
105	Control Room	Domain 3 - No 4 Shaft Pit Top &	25.3	39.9	0.0	
106	Pumphouse	Domain 3 - No 4 Shaft Pit Top &	26.8	44.6	0.0	
107	Shed 3	Domain 3 - No 4 Shaft Pit Top &	25.1	38.6	0.0	
108	Demountable	Domain 3 - No 4 Shaft Pit Top &	77.8	326.9	0.0	
109	Shaft 4 x 3 storeys	Domain 3 - No 4 Shaft Pit Top &	40.7	100.9	0.0	
110	Water Tank	Domain 3 - No 4 Shaft Pit Top &	47.0	175.9	0.0	
111	High level tank 1	Domain 3 - No 4 Shaft Pit Top &	10.4	8.6	0.0	
112	High level tank 2	Domain 3 - No 4 Shaft Pit Top &	10.4	8.6	0.0	
113	High level tank 3	Domain 3 - No 4 Shaft Pit Top &	10.4	8.6	0.0	
114	Maturation Pond	Domain 3 - No 4 Shaft Pit Top &	94.2	422.9	0.0	
115	Pasveer No. 2 - Blackwater Treatment Pond	Domain 3 - No 4 Shaft Pit Top &	51.8	213.1	0.0	
116	Collection Dam footprint	Domain 3 - No 4 Shaft Pit Top &	224.4	2826.2	0.3	
117	Collection Dam waters	Domain 3 - No 4 Shaft Pit Top &	194.3	1988.8	0.2	
118	Stormwater Dam	Domain 3 - No 4 Shaft Pit Top &	55.4	194.1	0.0	
119	Outer	Domain 3 - No 4 Shaft Pit Top &	39.2	111.5	0.0	
120	inner	Domain 3 - No 4 Shaft Pit Top &	25.9	46.4	0.0	
121	Magazine building	Domain 3 - No 4 Shaft Pit Top &	29.8	46.5	0.0	
122	Nitrate area	Domain 3 - No 4 Shaft Pit Top &	10.6	6.7	0.0	
123	Underground diesel tank	Domain 3 - No 4 Shaft Pit Top &	3.0	0.5	0.0	
124	Fence line	Domain 3 - No 4 Shaft Pit Top &	916.6	50786.9	5.1	
125	Small building	Domain 3 - No 4 Shaft Pit Top &	16.3	14.2	0.0	
126	Domain 3 area 1 not requiring rehab	Domain 3 - No 4 Shaft Pit Top &	3410.7	26699.6	2.7	
127	Magazine fence line	Domain 3 - No 4 Shaft Pit Top &	111.4	746.4	0.1	
128	Area requiring fertiliser and treatment, planting 1	Domain 3 - No 4 Shaft Pit Top &	338.7	2211.7	0.22	
129	Area requiring fertiliser and treatment, planting 2	Domain 3 - No 4 Shaft Pit Top &	1022.3	3783.4	0.38	
130	No 2 shaft vent fan	Domain 4 - UG Mining Area	137.7	486.9	0.05	
131	No 1 and 2 shaft switchyard	Domain 4 - UG Mining Area	76.7	388.1	0.04	
132	Old building	Domain 4 - UG Mining Area	60.7	191.3	0.02	
133	No 1 shaft tank	Domain 4 - UG Mining Area	21.3	33.5	0.00	
134	No 1 shaft	Domain 4 - UG Mining Area	41.6	95.4	0.01	
135	Old buildings	Domain 4 - UG Mining Area	40.0	70.2	0.01	
136	Fence	Domain 4 - UG Mining Area	131.6	684.5	0.07	
137	Switchyard fence	Domain 4 - UG Mining Area	68.4	260.3	0.03	
138	Other building	Domain 4 - UG Mining Area	25.0	33.7	0.00	
139	No 1 and 2 shafts disutrbed area requiring rehabilitatio	Domain 4 - UG Mining Area	236.0	1097.3	0.11	
140	Firetrail	Domain 4 - UG Mining Area	1171.3	4277.9	0.43	
141	No 3 vent shaft	Domain 4 - UG Mining Area	69.6	184.6	0.02	
142	No 3 shaft fence a	Domain 4 - UG Mining Area	49.6	147.5	0.01	
143	Disturbed area for rehab including fenced areas	Domain 4 - UG Mining Area	443.6	2784.6	0.28	
144	No 5 shaft, vent fan and substation	Domain 4 - UG Mining Area	112.8	360.6	0.04	
145	Disturbed area for rehabilitation shaft 5	Domain 4 - UG Mining Area	3515.1	16534.1	1.65	
146	Underground tanks	Domain 4 - UG Mining Area	68.4	238.1	0.02	
147	Pit Top Dam	Domain 1 - RV Pit Top	186.6	1622.1	0.16	
148	Fire Dam	Domain 1 - RV Pit Top	98.4	519.4	0.05	
149	discharge weir near Broker Street	Domain 1 - RV Pit Top	86.6	298.6	0.03	
150	SWCD Stormwater Control Dam	Domain 1 - RV Pit Top	402.2	10677.5	1.07	
151	Minor dam	Domain 1 - RV Pit Top	157.6	1084.4	0.11	
152	Minor dam	Domain 1 - RV Pit Top	105.3	206.3	0.02	
153	Turkeys nest dam	Domain 1 - RV Pit Top	159.1	1872.6	0.19	
154	Turkeys nest dam	Domain 1 - RV Pit Top	157.4	1777.0	0.18	
155	Placemark	Domain 1 - RV Pit Top	192.6	2412.5	0.24	
156	Dam	Domain 1 - RV Pit Top	239.0	2051.9	0.21	
157	Settling Pond 2	Domain 1 - RV Pit Top	162.8	1008.0	0.10	
158	Settling Pond 1	Domain 1 - RV Pit Top	207.2	2037.8	0.20	
159	Russell Road	Domain 1 - RV Pit Top	1840.3	5935.2	0.59	
160	Other stabilised surface Domain 5	Domain 1 - RV Pit Top	423.6	1352.1	0.14	

APPENDIX D

Russell Vale RCE

Rehabilitation Cost Estimation Tool

The *Mining Act 1992* and the *Petroleum (Onshore) Act 1991* allow the Minister for Resources (or delegate) to impose and vary a security deposit condition on authorisations or titles granted under these Acts. The **security deposit** is required for the fulfilment of obligations under the authorisation or title (hereon in referred to as an authority), including those related to rehabilitation, and obligations that may arise in the future. Authority holders are required to submit a Rehabilitation Cost Estimate (RCE) whenever a potential change in rehabilitation liability occurs and at other key points throughout the tenure of an authority. The RCE is used by the NSW Department of Planning and Environment, Division of Resources and Geoscience (DRG) to assist in determining the amount of the security deposit required for an authority.

The objective of the Rehabilitation Cost Estimation Tool (the RCE Tool) is to provide exploration, mining and petroleum operators with guidance on calculating an appropriate RCE for their operations by assisting in the assessment and quantification of rehabilitation risks and liabilities pursuant to the *Mining Act 1992 and Petroleum (Onshore) Act 1991*.

Please Note: The RCE Tool does not apply to the sealing of petroleum wells associated with exploration and production activities under the Petroleum (Onshore) Act 1991. Petroleum title holders can use the RCE Tool for guidance on calculating an appropriate RCE for disturbance associated with their activities. However, it is the expectation that a separate estimate is submitted for the sealing of petroleum wells, with the RCE prepared by a suitably qualified expert in consideration of the scale, nature, risks and age associated with petroleum wells specific to the petroleum title. For petroleum production use the Open Cut Button. For petroleum exploration use the Exploration Button.

Prior to calculating a RCE, authority holders using the RCE Tool should refer to the *Rehabilitation Cost Estimate Tool Handbook* which provides guidance information about, and step by step instructions on how to use, the RCE Tool. The Handbook is available at the following location on the Department's website: http://www.resourcesandenergy.nsw.gov.au/miners-and-explorers/rules-and-forms/pgf

Calculating a RCE

The framework of the RCE Tool has been developed in accordance with a tiered risk-based approach to calculating rehabilitation costs whereby the outcome of the estimation will be based on the nature, size, scale and complexity of the operation. While the authority holder has the opportunity to nominate unit rates* which are not the same as those in the RCE Tool, any other unit rate proposed by the authority holder must be based on a third party cost as it is assumed that if the authority holder defaults on their responsibility to rehabilitate the mine or exploration operation(s), a contractor will be engaged by the Government to carry out the required rehabilitation works.

Select Type of Mining/Exploration Operations from Buttons Below

By selecting the relevant type of mining/petroleum/exploration operation (below), followed by the **ENTER** button, the worksheet relevant to the operation type will be activated. Each worksheet shows the domains likely to be present for the operation type. A worksheet must be completed, with **ALL** relevant domains, in order to estimate the total rehabilitation costs for the exploration,

*Note: DRG may regularly make changes and updates to the spreadsheet as necessary. All authorisation holders are encouraged to use the most recent version of the spreadsheet, available on the DRG website.

Site Registration

Date October 2019

Complete the following fields prior to calculating the Security Deposit.

Mine Name:	Russell Vale Colliery
Lease(s):	CCL745, ML1575 and MPL271
Title Holder:	Wollongong Coal Limited
Mine Operator:	Wollongong Coal Limited
Expiry of MOP:	1-9-2020
Current Security:	$7,662,000
Date of last Security Deposit review	15-11-2018
Mine Contact:	Ron Bush
Position:	Group Environment and Approvals Manager
Address:	PO Box 281, FAIRY MEADOW NSW 2519
Phone:	02 4283 7449
Email:	rbush@wcl.net.au

Site Description

The following site specific information is requested to provide background information in the context of calculating the Security Deposit.

Summary of Mine Activities

Total annual production (tonnes): N/A Care and Maintenance

Mine lease area (ha): 6545

Area of extraction (ha):

Area of disturbance (ha): 103

Rehabilitation in progress (ha):

Rehabilitation complete (ha):
Achieved ecosystem sustainability

MOP Utilised:
Reference MOP no. version and date

MOP Plan(s) utilised:
Reference Plan no. version and date

1

2

3

☐ Plan(s) attached

NOTE:
Ensure rehabilitation cost estimation reflects all environmental issues affecting the lease. Contingencies should be allocated where costs have not been incorporated elswhere in the estimation.

Environmental Sensitivities

Surrounding land use (tick all that apply):

- ☐ Cropping
- ☐ Pasture
- ☑ Forest
- ☐ Undisturbed habitat
- ☑ Urban

Environmental Issues affecting site (tick all that apply)

- ☐ Threatened flora
- ☐ Threatened fauna
- ☑ Cultural heritage items
- ☑ Natural heritage features
- ☑ Mine subsidence
- ☑ Surface water pollution
- ☐ Ground water pollution
- ☑ Hydrocarbon contamination
- ☑ Methane drainage/venting
- ☐ Spontaneous combustion
- ☐ Acid Mine Drainage
- ☑ Within drinking water catchment
- ☐ Other (describe below)

Underground Summary Rehabilitation Cost Estimation

Note: Sections of this page are automatically filled in from the registration page

Mine Name:	Russell Vale Colliery
Lease(s):	CCL745, ML1575 and MPL271
Mine Owner:	Wollongong Coal Limited
Mine Operator:	Wollongong Coal Limited
Expiry of MOP:	1-9-2020
Current Security:	$7,662,000
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Mine Contact:	Ron Bush
Position:	Group Environment and Approvals Manager
Address:	PO Box 281, FAIRY MEADOW NSW 2519
Phone:	02 4283 7449
Email:	rbush@wcl.net.au

Domain		Security Deposit
Domain 1: Infrastructure		8,054,763.15
Domain 2: Tailings & Rejects		279,500.06
Domain 3: Overburden & Waste		
Domain 4: Subsidence & Management		1,169,129.68
Subtotal (Domains and Sundry Items)		**$9,503,392.89**
Contingency	**10%**	**$950,339.29**
Post Closure Environmental Monitoring	**10%**	**$950,339.29**
Project Management and Surveying	**10%**	**$950,339.29**
Total Security Deposit for the Mining Project (excl. of GST)		**$12,354,410.75**

Note: GST is not included in the above calculation or as part of rehabilitation security deposits required by the Department

☑ Alterations have been made to unit prices within this spreadsheet. (Attach a separate sheet providing details of changes).

☐ The proposed rehabilitation design is generally consistent with the development consent for the project.

This Registration Form, Summary Report and calculation pages are to be printed and attached as an appendix the AEMR or MOP.

This mine security calculation has been estimated using the best available information at the time.
It is a true and accurate reflection of the total rehabilitation liability held by this mine.

Company Representative's Name **Date**

Company Representative's Role / Responsibility **Signature**

Underground Operations

Domain 1a: Infrastructure

Total Cost for Infrastructure Domain **$5,553,590**

Additional Assumptions: *Record any relevant assumptions to this domain below:*

The post mining land use of the pit top area will be residential/commercial and retained access roads.	**Key Rehabilitation Area Data for Domain**	**Enter data below manually**
Given the post minng land use, no topsoiling amelioration or seeding of the pit top area will be undertaken	**Total Landform Establishment:**	
Domain 1a includes the demolition of all mining infrsatructure at the Russell Vale Pit Top and rehabilitation of surrounding dams	**Total Growth Media Development:**	
	Total Ecosystem Establishment:	

Management Precinct	Activity / Description	Applicable (Y or N)	Quantity	Unit	Default Unit Rate	Alternative Unit Rate	Total Cost	Basis for Costs Estimation and Additional Relevant Information	Description / Notes:
Termination of Services and Demolition Works	Disconnect and terminate all services (Water, electricity, gas etc at point of attachment to site)	Y	1	allow	$35,000		$35,000	Overall disconnection for the Pit Top area	For disconnection of all services, at building boundaries, physical cut at the point of attachment or distribution location. If infrastructure is not consolidated (i.e., administration, camp and workshops are in separate places), consider multiple disconnection fees
	Disconnect and terminate services at remote areas (i.e. pump stations, remote workshops, sewage treatment plant etc.)	Y		allow	$5,500		$0		Used for infrastructure remote from primary connection. Can also be used for small mines / quarries that do not have dedicated supplies from supply authorities such as steel lattice power lines.
	Removal of low/medium voltage powerlines including disconnection, rolling up the wires and removing the poles - does not include the removal of substations	Y		km	$15,000		$0		Applies to power lines on stobie, concrete or similar poles.
	Removal of power lines on tower or lattice structures (this includes disconnection, rolling up the wires and removing the structures) - does not include the removal of substations	Y		km	$100,000		$0		Applies to power lines on steel tower and steel lattice structures assuming 3 towers / km.
	Remove significant rail, road, water course overpass - manage potential interuptions and demolish and remove bridge supports/pylons/bridge structure etc. and dispose of waste material on-site/locally	Y		Item	$350,000		$0		Major structures constructed for the purposes of mining related works - does not include transport to regional disposal facility or equivalent
	Demolish and/or remove substations (assumes they are in a closed building). Dispose of waste material on-site/locally	Y	54.3	m2	$600.00		$32,580	Substation 002, substation next to admin car park.	Simple structure to demolish. Assumes single story building and segregation of contents for scrap as applicable.
	Demolish and remove switchyard. Dispose of waste material on-site/locally	Y	226.7	m2	$55.00		$12,469	Demolish and remove switchyard next to Integral Energy (187m2) and new switchyard next to 1887 portal (39.7m2) (excludes decontamination, removal of oil, etc.)	Includes demolition and removal of all switchgear and transformers etc. and segregation of contents for scrap as applicable.
	Demolish and remove demountable structures on concrete stumps. Assumes not being re-used	Y	1422.8	m2	$40.00		$56,912	Demountables include 2 storey bathhouse (234m2), muster room (213.9m2), electrical and mechanical spares (179 and 178m2), buildings near new switchyard (44m2), near emplacement, and rest stop for drivers.	Crib huts, temporary offices and other 'non permanent' structures. Does not include transport to regional disposal facility or equivalent.
	Demolish and remove small buildings/tanks (admin buildings, single story accommodation etc) and disposal on-site/locally	Y	4913.9	m2	$65.00		$319,404	Small buildings include fire equipment storage (32.8m2), storage shed next to Maintenance (543.8m2), first aid/training crib room (256.1m2), operations office (236.3m2 two stories high), 1887 portal and archway building and workshop (773.6m2), fire station (30.8 m2), compressor shed (468.1m2) and electrical switchroom (297.4m2), and sheds. and small buildings include workshops, office, shed, control room, at CHPP area.	Simple structure to demolish, assumes no greater than 2 stories high. Does not include transport to regional disposal facility or equivalent.
	Demolish and remove light industrial buildings and disposal on-site/locally	Y	5390	m2/floor	$115.00		$619,850	Includes admin building (691.7m2 * 2 storeys) and Maintenance building (2002.5m2 * 2 storey)	Needs to be calculated per floor/level (Assume 1 floor/level = 3-4 m). Does not include transport to regional disposal facility or equivalent
	Demolish and remove industrial buildings (workshops tyre change and servicing area etc not CHPP/process plant) and disposal on-site/locally	Y		m2/floor	$180.00		$0		Needs to be calculated per floor/level (Assume 1 floor/level = 3-4 m). Does not include transport to regional disposal facility or equivalent
	Demolish and remove CHPP/process plant (include the area of each floor of the structure) and disposal on-site/locally	Y	609	m2/floor	$265.00		$161,385	Demolish and remove crusher - 3 floors @ 203m2	Needs to be calculated per floor/level (Assume 1 floor/level = 3-4 m). Does not include transport to regional disposal facility or equivalent
	Collapse, demolish and remove washery, crushers, hoppers, mills, furnaces, agglomeration, electrowinning, floatation, sizing stations, rotary breakers, etc (include the area of each floor of the structure) and disposal on-site/locally	Y	789.1	m2/floor	$265.00		$209,112	Demolish hopper(146.2m2), stacker (214.3m2*3 floors)	Needs to be calculated per floor/level (Assume 1 floor/level = 3-4 m). Does not include transport to regional disposal facility or equivalent
	Collapse, demolish and remove stacker OR reclaimer (radial or luffing etc. with maneuverability for stockpile control) and disposal on-site/locally	Y		allow	$1,000,000		$0		Cost for removal of stacker or reclaim unit only. Does not include terminate services, remove rails and ballast etc. Does not include transport to regional disposal facility or equivalent
	Collapse, demolish and remove bucket wheel stacker/reclaimer and disposal on-site/locally	Y		allow	$2,500,000		$0		Cost for just removal of the bucket wheel stacker/reclaim units. Does not include terminate services, remove rails and ballast etc. Does not include transport to regional disposal facility or equivalent
	Remove stacker/reclaimer rails and ballast and demolish and remove concrete footings etc and disposal on-site/locally	Y		m	$75.00		$0		Includes both rails, does not include the conveyor system. Does not include transport to regional disposal facility or equivalent

Collapse, Cut and Remove 5000T coal silo and disposal on-site/locally	Y		allow	$100,000		$0		Collapse structure and remove. Does not include transport to regional disposal facility or equivalent.
Collapse, Cut and Remove 3000 T coal silo and disposal on-site/locally	Y		allow	$85,000		$0		Collapse structure and remove. Does not include transport to regional disposal facility or equivalent.
Collapse, Cut and Remove 1250 T coal silo and disposal on-site/locally	Y	1	allow	$65,000		$65,000	Collapse and remove 600T silo near to roadway	Collapse structure and remove. Does not include transport to regional disposal facility or equivalent.
Collapse, Cut and Remove rail loading bins and disposal on-site/locally	Y		allow	$65,000		$0		Collapse structure and remove. Does not include transport to regional disposal facility or equivalent.
Demolish and remove onground conveyors, transfer stations & gantries (scrap only – does not include dismantling for reuse at another site) and disposal on-site/locally	Y	266	m	$210.00		$55,860	Estimate for on-ground conveyer - includes anything up to ~4.5 m off the ground. Assumed to be 266 m of 391 m length	Estimate for on-ground conveyor including anything up to 10 m off the ground. Does not include transport to regional disposal facility or equivalent.
Demolish and remove elevated conveyors, transfer stations & gantries (scrap only, does not include dismantling for reuse at another site) and disposal on-site/locally	Y	125	m	$370.00		$46,250	~125 m elevated conveyor of 391 m length (includes RV1 gantry and decline belt). Estimate for elevated conveyer from ~5 up to ~10 m off the ground	Estimate for elevated conveyor up to ~10 m off the ground. Does not include transport to regional disposal facility or equivalent.
Demolish and remove overhead conveyors, transfer stations & gantries (scrap only, does not include dismantling for reuse at another site) and disposal on-site/locally. This may include small scale fixed material stacking infrastructure	Y		m	$1,200		$0		Estimate for overhead conveyor including conveyors that are >10 m off the ground that require a crane to remove. Does not include transport to regional disposal facility or equivalent.
Demolish reclaim tunnel, cut reo and expose reclaim conveyor, then collapse into the reclaim tunnel void (Does not include excavation to expose reclaim tunnel, removal of conveyor or backfilling void)	Y	90	m2	$80.00		$7,200	Does not include conveyor removal or backfill. Assumes 30 m tunnel length, 3 m width.	Does not include conveyor removal or backfill.
Remove and demolish conveyor from reclaim tunnel (Does not include excavation and demolition of reclaim tunnel roof)	Y	30	m	$150.00		$4,500	Demolish reclaim conveyor - assumes 30m length	Due to no canopy or infrastructure attached.
Demolition of reclaim tunnel concrete (Assumes complete removal and dumping in mine pit void)	Y		m	$950.00		$0		Assumes this area will be used for another land-use that requires the structure to be dug up and re-buried somewhere else.
Demolish and remove small tank clean (Thickener etc 3 - 9 m diameter) and disposal on-site/locally	Y	1	allow	$10,000		$10,000	1 iron tank located near admin car park of ~4 m diameter.	Assume tank is clean - contents removed. If tank is full allow extra 30% for excavator and 2 men to dig out and dispose. Does not include transport to regional disposal facility or equivalent.
Demolish and remove medium tank clean (Thickener etc 10 - 15 m diameter) and disposal on-site/locally	Y	1	allow	$30,000		$30,000	Tank is approximately 11 m in diameter.	Assume tank is clean - contents removed. If tank is full allow extra 30% for excavator and 2 men to dig out and dispose. Does not include transport to regional disposal facility or equivalent.
Demolish and remove large tank clean (Thickener etc 15 - 30 m diameter) and disposal on-site/locally	Y	1	allow	$45,000		$45,000	Thickener is approximately 25 m in diameter.	Assume tank is clean - contents removed. If tank is full allow extra 30% for excavator and 2 men to dig out and dispose. Does not include transport to regional disposal facility or equivalent.
Demolish and remove extra large tank clean (Thickener etc >30 m diameter) and disposal on-site/locally	Y		allow	$85,000		$0		Assume tank is clean - contents removed. If tank is full allow extra 30% for excavator and 2 men to dig out and dispose. Does not include transport to regional disposal facility or equivalent.
Demolish and remove tank clean (Thickener etc) >50 m diameter and disposal on-site/locally	Y		allow	$100,000		$0		Estimate only - may require a detailed assessment from demolition expert due to specialised equipment required for removal. Does not include transport to regional disposal facility or equivalent.
Removal of UG tank <5000 L - including pipes, bunds etc. and disposal on-site/locally	Y		allow	$21,000		$0		Assume tank is clean (contents removed), does not include transport to regional disposal facility or equivalent.
Removal of UG tank 5000 L - 15000 L - including pipes, bunds etc. and disposal on-site/locally	Y		allow	$30,000		$0		Assume tank is clean (contents removed), does not include transport to regional disposal facility or equivalent.
Remove small underground pipe and disposal on-site/locally	Y	928.595	m	$25.00		$23,215	300 mm pipes removed to 0.5 m depth. Assume 15% of surface pipelines are underground where roads are crossed, etc.	For example: 300 mm pipes - 0.5 m deep, does not include transport to regional disposal facility or equivalent.
Remove medium underground pipe and disposal on-site/locally	Y	307.5	m	$60.00		$18,450	500 mm pipes removed to 1 m depth (pipes are 400 and 450 mm - one assumed)	For example: 500 mm pipes - 1 m deep, does not include transport to regional disposal facility or equivalent.
Remove large underground pipe and disposal on-site/locally	Y		m	$165.00		$0		For example: 1 m pipes - 2 m deep.

	Remove above ground pipe (supported) and disposal on-site/locally	Y	4810.405	m	$12.00		$57,725	~300mm pipes - assumes pipes are in close proximity to infrastructure areas . Pipelines include pipelines from Fire and Pit Top Dams, fire water pipeline behind the visitors shed; pipelines to ventilation fan, to CHPP areas, and from the SCA tanks on CCL lease which do not belong to WCL (5x). Excludes sprays in coal handling plant area. Assumes 85% of pipeline above ground and 15% underground at road crossings etc	~300 mm pipes and assumes pipes are in close proximity to infrastructure areas. Does not include transport to regional disposal facility or equivalent.
	Remove surface pipelines (unsupported) and disposal on-site/locally	Y		m	$15.00		$0		~300 mm pipes and assumes pipes are used for water transfer between pits (or similar) and remotely located. Does not include transport to regional disposal
	Remove pump and pontoon from a lake or dam including pipes and electrical supply or diesel tank/s and disposal on-site/locally	Y		allow	$150,000		$0		Assumes infrastructure is moored and requires barge mobilisation to sever the mooring and / or is a significant fixed structure for controlled release of water. Does not include transport to regional disposal facility or equivalent
	Remove bitumen (car park and access roads) and dispose on-site/locally	Y	31442.5	m2	$10.00		$314,425	Main Infrastructure Area bitumen (incl. lower car park) (30089m2) Broker Street will be retained for access for post mining use, etc. Assume all bitumen areas will be removed for use as commercial/residential area. And parking area near REA (1353.5m2)	Scalp bitumen and stabilised material. Generally haulage rates will be $0.60 - $1.20 / km, depending on truck fleet, loaders etc. For off-site disposal use alternate rate option and add $0.90 / km for transport.
	Remove bitumen (airstrip) and dispose on-site/locally	Y		m2	$20.00		$0		Scalp bitumen and stabilised material. Generally haulage rates will be $0.60 - $1.20 / km, depending on truck fleet, loaders etc. For off-site disposal use alternate rate option and add $0.90 / km for transport.
	Remove concrete pads & footings (<300 mm thickness) and disposal on-site/locally	Y	7663.29	m2	$37.00		$283,542	Removal of concrete pads from small buildings. Assumes small building footprint plus 10% to account for aprons etc Also concrete around WCL switchyard section and buildings significantly larger than apron). (608m2) Conveyor concrete length (330m*5m wide)	Breaking up slab and disposal or for conversion to aggregate. Generally haulage rates will be $0.60 - $1.20 / km, depending on truck fleet, loaders etc. For off-site disposal use alternate rate option and add $0.90 / km for transport.
	Remove concrete pads & footings (>300 mm thickness) and disposal on-site/locally	Y	8164.5	m2	$75.00		$612,338	Removal of concrete pads from small industrial buildings. Includes admin building (691.7m2 and Maintenance building (2002.5m2) Assumes small industrial building footprint plus 10% to account for aprons etc and Includes crusher base (203m2) concrete area by hopper for truck access (2373m2) and concrete thickener base (2623m2).	Breaking up slab and disposal or for conversion to aggregate. Generally haulage rates will be $0.60 - $1.20 / km, depending on truck fleet, loaders etc. For off-site disposal use alternate rate option and add $0.90 / km for transport.
	Crush concrete to make road aggregate - 75 mm	Y		tonne	$17.00		$0		Does not include haulage of materials - assumes crushing plant is readily available.
	Crush concrete to make road aggregate - 50 mm	Y		tonne	$20.00		$0		Does not include haulage of materials - assumes crushing plant is readily available.
	Crush concrete to make road aggregate - 30 mm	Y		tonne	$22.00		$0		Does not include haulage of materials - assumes crushing plant is readily available.
	Remove fence (cyclone/wire fence) and disposal on-site/locally	Y		m	$20.00		$0		Roll up fence and remove posts.
						Termination of Services and Demolition Works Subtotal	**$3,020,214**		
Rail Infrastructure	Remove rail loop and spur, ballast etc. and disposal on-site/locally	Y		m	$60.00		$0		Remove all materials to allow area to be reshaped and rehabilitated - does not include transport to regional disposal facility or equivalent
	Remove train loading facilities and disposal on-site/locally	Y		m2	$265.00		$0		Remove rail load point infrastructure including gantries and control structures. Does not include transport to regional disposal facility or equivalent
	Reshape rail spur and load out areas. Does not include growth media and revegetation	Y		ha	$2,500		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation).
						Rail Infrastructure Subtotal	**$0**		

Contaminated Materials	Undertake a preliminary site investigation (Phase 1). This accounts for current and historical locations where areas of disturbance are clustered. If there are multiple cluster areas on site, multiple studies may be required.	**Y**	2	Cluster	**$15,000**		**$30,000**	**Cost for a general phase 1 assessment of a mine infrastructure area - maintenance area, laydown yard.**	The preliminary investigation would include at minimum a desktop assessment of the area and site history, incidents, etc. as per the National Environmental Protection (Site Contamination) Measure (NEPM) Phase 1 assessment (EP Act Section 389 (2) (iv)) or similar approved and recognised assessment method. A cluster may include: - Mine infrastructure (i.e., fuel / chemical store, workshop, vehicle wash-down, sewage treatment etc.) - Processing plants (i.e., ore and product storage, mine waste storage and disposal, rail load-out etc.) - Remote pit-top facilities (i.e., vehicle re-fuel, sewage treatment, secondary workshop, chemical
	Undertake an intrusive site investigation. This accounts for current and historical locations where areas of disturbance are clustered. If there are multiple cluster areas on site, multiple intrusive investigations should be included.	**Y**		Cluster	**$100,000**		**$0**		The intrusive investigation would include at minimum a site walkover and field sampling as per the National Environmental Protection (Site Contamination) Measure (NEPM) Phase 2 intrusive investigation (EP Act Section 389 (2) (iv)) or similar approved and recognised assessment method. Note: An intrusive investigation is not required for all contaminated areas and should be applied considering the rehabilitation program, site history, location, etc. A cluster area where it is highly anticipated that contamination has occurred (i.e. underground tanks / pipes that are known to have leaked, chemical stores with earthen bunds, around ineffective oil/water separators etc.) and further field work is required.
	Removal and disposal of contaminated water from tanks, bunded areas and sumps	**Y**		L	**$0.35**		**$0**		Cost for recent sump clean-up from resource activity - requires specialists to treat.
	Remove material (carbonaceous / metalliferous spillage or otherwise) from footprint of the process facility (leach pads) / stockpile area (ROM product) / roads and dump in a void on-site (haul distance >1 km but <2 km)	**Y**	48471.07	m3	**$5.31**		**$257,485**	**> 1km but < = 2km** **Assumes 0.5m depth of spillage and haul to REA** **Remove carbonaceous material (spillage or otherwise) from footprint of the CHPP (14784m2), ROM (24850m2), Product stockpiles (24759m2) and roadways (13594m2) (haul distance >1 km but <2 km).** **reject carbonaceous from storage area adjacent to CHPP Assumed to be 25,000 tonnes of sill at a factor of 2.8 for bcm conversion.** **Haul road (3809m2)**	D10 Rip and push into void at $270/hr, 0.2ha/hr, 150mm deep. 657 Scrapers cut to spoil at $430/hr, 130BCM/hr/machine, Ancillary watercart and grader at $0.75c/m3
	Load, cart and dispose of High Level contaminated material off site to a licensed landfill. Assumes cartage to a licensed landfill	**Y**		m3	**$700.00**		**$0**		Includes load, haul and dump fees to a licensed facility.
	Load, cart and disposal of Low Level contaminated material off site to a licensed landfill. Add $50/m3 for cartage to regional landfill	**Y**	200	m3	**$200.00**		**$40,000**	**Includes load, haul and dump fees to a licensed facility. Assumes a maximum contamination on the site of 200 m3 hydrocarbon contaminated material requires removal from the Maintenance area.**	Includes load, haul and dump fees to a licensed facility.
	Onsite remediation of hydrocarbon contaminated soils manual land farming (Select Volume from List)	**Y**		m3	**Select from List**			**Select Volume Here**	Spreading of contaminated soils on a prepared surface and stimulation of aerobic microbial activity within the soils through aeration and/or the addition of minerals, nutrients and moisture to promote the aerobic degradation of organic chemicals - time frame of up to 24 months.
	Mobilisation of cement stabilisation plant and equipment for hydrocarbon (i.e., PAH, long chain hydrocarbons, etc.) contaminated soil treatment	**Y**		Item	**$150,000**		**$0**		Required if treatment of hydrocarbon contamination is required to be fast tracked.
	On-site remediation of hydrocarbon contaminated soils - using a mobile treatment unit	**Y**		m3	**$165.00**		**$0**		Additional cost as the treatment process is fast tracked.
	Remove and dispose of asbestos (<750 m2)	**Y**		m2	**$50.00**		**$0**		Where an assessment/estimation has been made to confirm the volume of asbestos to be removed.
	Remove and dispose of asbestos (>750 m2)	**Y**	1000	m2	**$40.00**		**$40,000**	**Provisional sum for asbestos disposal ~1000 m2 assumed (asbestos has been found on site previously but has not been quantified).**	Where an assessment/estimation has been made to confirm the volume of asbestos to be removed.
	Remove and dispose of asbestos	**Y**		tonne	**$2,400**		**$0**		6 mm asbestos sheet approx. 15 kg / m2 = ~70 m2 per ton. Allowing $20 / m2 for removal, 4 hours trucking @$125 and $100 / t disposal plus 20% OHP = $2,400 / t
	Treatment of known Acid Sulfate Soils	**Y**		ha	**$2,580**		**$0**		Assumes ASS is treatable via neutralisation and does not require capping and isolation.
	Removal and disposal of plastic liner (i.e. dam, leach pad, sump etc.)	**Y**		m2	**$1.00**		**$0**		Provisional sum for cutting using ripping tynes and on-site disposal of the liner.
						Contaminated Materials Subtotal	**$367,485**		

Vents, Shafts and Boreholes	Seal portals / drifts (width >3 m) – backfill the access for at least 50 m against a concrete bulk head with drainage slots. The rate includes some reshaping of batters around the adit entrance. If concrete bulk head not required, reduce rate by 25%	**Y**	6	allow	**$250,000**		**$1,500,000**	**Seal and rehabilitate open portals including: 1. Gibsons No 3 Portal 2. Track road portal to No 4 shaft 3. Wonga Mains C heading RTV portal 4. Balgownie seam conveyor intake to No.1 seam 5. Balgownie seam conveyor intake to No.2 seam 6. Wonga Mains B heading intake conveyor portal**	Cost estimated from planned and executed works programs in NSW from multiple sites. Rate accounts for a range of factors including variations in depth and size, accessability limitations, requirements for extra roof and/or rib support, equipment transport into the underground etc.
	Seal small adits (width <3 m) – install 0.5 concrete plug 3 m back from adit and backfill with appropriate material. The rate includes some reshaping of the batter around the entrance of the adit	**Y**		allow	**$25,000**		**$0**		Cost estimated from planned and executed works programs in NSW from multiple sites. Rate assumes standard works program with suitable access, and additional roof and rib stabilisation works etc. is not required.
	Seal and rehabilitate ventilation fans shafts - allows for works in a remote location	**Y**	1	allow	**$150,000**		**$150,000**	**Seal ventilation shaft 1. Wonga Mains A heading return fan portal**	Cost estimated from planned and executed works programs in NSW from multiple sites. Rate accounts for a range of factors including variations in depth and size, accessability limitations, equipment transport to the shaft etc.
	Install gate or grill over the adit (Where site might be used by bats)	**Y**		Item	**$200,000**		**$0**		Rate accounts for a range of factors including establishing clear access, and/or working in remote locations without services, and/or stabilisation works to prevent the entry collapsing and compromising the gate etc.
	Exploration boreholes – rehabilitate boreholes and drill pads as required	**Y**		depth (m)	**$40.00**		**$0**		Where multiple boreholes exist, this is the rate for the total cumulative depth of all boreholes (e.g. two boreholes at 100m depth each = 200m). Assumes a per metre drilling rate of ~$150 / m of which ~25 - 30% is for rehabilitation which may include a variety of works (i.e., cut casing and install cap, install poly pipe to facilitate back-filling, grout preparation, grouting and capping, reshaping / ripping the drill pad,
	Exploration boreholes – backfill open bore holes with cuttings	**Y**		allow	**$300.00**		**$0**		May include cutting of casing, installation of a casing cap, and/or manually backfilling the hole with drill cuttings. Does not include reshaping / ripping the drill pad, amelioration / seeding etc.
	Exploration boreholes – grout and cap open bore holes	**Y**		allow	**$7,950**		**$0**		Includes grouting and capping 100 - 200 m exploration boreholes to meet the requirements of EDG01.
	Boreholes – cap and seal open bore holes with steel casing (i.e., goaf drainage etc.)	**Y**	53	allow	**$6,960**		**$368,880**	**53 monitoring piezometer boreholes identified from figures requiring capping and sealing within the underground mining area**	Holes deeper than 100 m - includes cutting steel collar 6 m below surface, grouting and capping.
	Boreholes – cap and seal open bore holes - surface-to-in-seam gas drainage	**Y**		allow	**$15,000**		**$0**		Surface-to-in-seam gas drainage boreholes.
	Boreholes – cap and seal open bore holes - vertical gas drainage	**Y**		allow	**$16,000**		**$0**		Vertical gas drainage boreholes.
	Boreholes – grout (with concrete) cap and seal bore holes (i.e. where sealing aquifers)	**Y**		allow	**$35,000**		**$0**		Includes multi skin sleaves to prevent aquifer mixing.
	Boreholes – cap and seal service boreholes for UG operations	**Y**		allow	**$45,000**		**$0**		Includes large diameter boreholes used for supplying electricity (66kV), compressed air, water, solsenic etc.
					Vents, Shafts and Boreholes Subtotal		**$2,018,880**		
Roads and Tracks	Unsealed roads / vehicle park-up areas – minor works including deep rip and trim	**Y**		ha	**$960.00**		**$0**		Assumes ~6 m road width - 16H Grader @ $212 per hour.
	Unsealed roads / access tracks / vehicle park-up areas with windrows and/or small earthen bunds – minor earthworks and deep rip and trim	**Y**		ha	**$1,500**		**$0**		Assumes ~20 m road width - D10 Dozer @ $332 per hour.
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip and seed (pasture grass)	**Y**		ha	**$3,698**		**$0**		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	**Y**		ha	**$4,485**		**$0**		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.

	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (pasture grass)	Y		ha	$3,820		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.
	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	Y		ha	$4,595		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.
	Remove stabilised material (blue metal, aggregate etc.) from roadways and disposal on-site/locally (haul distance < 1km)	Y	11524.9	m3	$4.45		$51,273	< =1km Remove gravel and stabilised material from new switchyard area and dump in opening to No. 4 shaft next to first aid/training building. And stabilised material from hardstand and laydown areas the product stockpile and ROM area Assume a depth of 0.5 m for the gravel. Scalp 0.3 m from Russell Road surface and dispose down nearest shaft.	D10 Rip and push into void at $270/hr, 0.2ha/hr, 150mm deep. 657 Scrapers cut to spoil at $430/hr, 150BCM/hr/machine, Ancillary watercart and grader at $0.75c/m3
						Roads and Tracks Subtotal	$51,273		
Earthworks / Structural Works (Landform Establishment)	Major bulk pushing to achieve grades nominated in the approval/permit – 50 m push length	Y	6129	m3	$0.80		$4,892	< 50m push Major bulk pushing to rehabilitate the eastern park up area (bunded hardstand between the truck wash and tyre wash areas) Assume bund height of 4 m, length of 116 m, and width of 6 m. Also includes bulk push to rehabilitate 2xturkeys nest dams (Assume length of 78 m and 157 m, base width of 3 m and height of 1 m.) nr Russell Road and settling	D11 push at $350 and 400 bcm/hr
	Minor reshaping and pushing	Y		ha	$3,900		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation).
	Fill dams, voids etc. - Source local material, cart and spread to cap or backfill, cap thickness determined by approval / permit (Select Haul Distance from List)	Y		m3	Select from List			Select Haul Distance Here	This item includes the volume of material requiring backfill using an excavator and scraper to fill the void and enable the establishment of rehabilitation.
	Shotcrete application on cuttings and steep slopes	Y		m2	$185.00		$0		This rate is used to rehabilitate steep slopes of weathered rock, roadway cuttings, etc that cannot be cut back and stabilised.
	Trim, rock rake & deep rip (includes levelling / landscaping and rip in 1 direction)	Y	7.65	ha	$960.00		$7,340	Only the ROM, product stockpile and vehicle park up areas and bare benches between the MIA and CHP and rehabilitated dams require trimming.	16H Grader @ $212 per hour - ripping in 1 direction only.
	Deep rip hard stand / lay down areas	Y		ha	$960.00		$0		D10 dozer @ $332 per hour - deep rip in 2 directions @ 5 m spacing ~3 hr per hectare.
	Structural works, banks, waterways - contour banks, drainage channels and other soil conservation measures	Y	7.65	ha	$1,600		$12,233	Only the ROM, product stockpile and vehicle park up areas and bare benches between the MIA and CHP and rehabilitated dams require waterworks.	Combination of dozer and excavator work. Small dozer (D6 or similar) @ ~$200 per hour plus grader @ $212 per hour for ~4 hours each per ha.
	Construction of spine drains / drop structures and/or stabilising water course entry points - required for large catchments	Y		m2	$35.00		$0		Installation of on-site rock material (rip-rap) where managing water run-off from disturbed land and/or upon entry to water courses - prevents erosion of gully head (assumes competent material is locally available)
						Earthworks / Structural Works (Landform Establishment) Subtotal	$24,465		
Land Preparation and Revegetation (Growth Media Development and Ecosystem Establishment)	Source, cart and spread growth media (Select Haul Distance from List)	Y		m3	Select from List			Select Haul Distance Here	If topsoil is not available on-site, then Virgin Excavated Natural Material (VENM) may need to be externally sourced.
	Planting mature trees (>15 cm)	Y		allow	$20.00		$0		4 m centres.
	Planting tube stock (<15 cm)	Y		allow	$10.00		$0		4 m centres.
	Direct seeding / fertiliser (pasture grass species)	Y		ha	$1,240		$0		Rate can fluctuate however this is a suitable standard rate.
	Direct seeding / fertiliser (tree or native grass species)	Y		ha	$2,095		$0		Rate can fluctuate however this is a suitable standard rate.
	Hydro-seeding with straw mulching and bitumen tack	Y		m2	$1.80		$0		Rate can fluctuate however this is a suitable standard rate.
	Single application of fertiliser (pasture)	Y		ha	$420.00		$0		Assumes 250 kg / ha. These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
	Single application of fertiliser (trees)	Y		ha	$140.00		$0		These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
	Spoil amelioration (adding lime / gypsum etc.)	Y		ha	$860.00		$0		Assumes 2.5 t / ha as an average application rate.
	growth media amelioration with biosolids	Y		ha	$1,015		$0		Recent experience with agronomy projects.
	Construct no-climb stock fence around rehabilitated areas	Y		m	$9.50		$0		Standard rate for no-climb stock fencing.
	Construct standard stock fence around rehabilitated areas	Y		m	$4.00		$0		Standard rate for standard stock fencing.
	Purchase and erect warning signs	Y		allow	$250.00		$0		Compliance with AS 1319-1994 - Safety signs for the occupational environment - installed every 25 m.
	Supply from external sources virgin excavated natural material (VENM) for growth media.	Y		m3	$80.80		$0		D7 to spread material at $205/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $70/m3 for imported fill material
	Supply from external sources a combination of virgin excavated natural material (VENM) and spoil from large excavation for filing voids and/or capping etc.	Y		m3	$72.50		$0		D10 push into void at $270/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $60/m3 for imported fill material
						Land Preparation and Revegetation (Growth Media Development and Ecosystem Establishment) Subtotal	$0		

Water Management	Clean water dams to be retained after decommissioning – make safe and minor earthworks	**Y**	6	allow	**$2,500**		**$15,000**	**Assumed dams to be retained are SWCD, discharge weir near Broker Street, Pit Top Dam, Fire Dam and 2 dams near the Underground Mining Area.)**	Provisional sum for earthworks and revegetation required to rehabilitate dam batters etc suitable for re-use by an alternate land-user - D6 Dozer (or similar) @ ~$200 per hour and pasture grass.
	Remove sediments from the floor of the dam to enable it to be converted into clean water structure (haul distance >1km but <2km)	**Y**	5274.9	m3	**$4.45**		**$23,473**	**> 1km but < = 2km** **Assume a depth of 0.3 m sediment within the SWCD (10678m2), discharge weir near Broker Street (299m2), Pit Top Dam (1622m2), Fire Dam (519m2) and 2 dams in the Underground Mining Area (2413m2 and 2052m2).**	80t excavator and 90c/m3 haul with artic trucks, 220m3/hr, three trucks required for short distance + 75c ancillary - excludes any stockpile treatment: no dozer (add 90c/m3 if required).
	Removal of evaporation fans and/or other water transfer and management infrastructure	**Y**	1	allow	**$25,000**		**$25,000**	**Allowance for removal of all ancillary water management infrastructure**	Provisional sum for removal of water management infrastructure.
						Water Management Subtotal	**$63,473**		
Maintenance of Rehabilitated Areas	Maintenance of areas that have been shaped and seeded and revegetation has been 'successful'	**Y**	7.65	ha	**$900.00**		**$6,881**	**Maintenance requirements will include survey works for residential lots, etc. Only the ROM, product stockpile and vehicle park up areas and bare benches between the MIA and CHP and rehabilitated dams require maintenance.**	Rehabilitation maintenance might include re-seeding, watering, fertilising, minor re-shaping, erosion control, inspections/audits - does not include major repair works.
	Existing rehabilitation repair - minor	**Y**	0.76	ha	**$1,200**		**$917**	**Assume 10% of the rehabiliated area will require minor repair**	Areas requiring minor repair - rills, minor growth media replacement.
	Existing rehabilitation repair - moderate	**Y**		ha	**$1,700**		**$0**		Areas requiring moderate repair - rills, significant growth media replacement.
	Existing rehabilitation repair - major	**Y**		ha	**$2,500**		**$0**		Areas requiring major repair - rills, gullies, growth media replacement, some level of additional surface water management.
	Existing rehabilitation repair - total failure of landform	**Y**		ha	**$40,000**		**$0**		Areas that require extensive rehabilitation repair - re-design and re-construction of landform.
						Maintenance of Rehabilitated Areas Subtotal	**$7,799**		
Additional Items	Other 1 <insert>	**N**			**This is**				This item includes **<<to be added by the operator>>**
	Other 2 <insert>	**N**			**deliberately**				This item includes **<<to be added by the operator>>**
	Other 3 <insert>	**N**			**left blank**				This item includes **<<to be added by the operator>>**
						Additional Items Subtotal	**$0**		
Total Cost for Infrastructure Domain							**$5,553,590**		

Underground Operations

Domain 2a: Tailings & Rejects

Total Cost for Tailings & Rejects Domain **$279,500**

Additional Assumptions: *Record any relevant assumptions to this domain below:*

Only the portion of the REA on the mining lease has been included in this cost estimate.	**Key Rehabilitation Area Data for Domain**	**Enter data below manually**
In accordance with the consent the capping of the REA will include 300mm clay, 500mm subsoil and 150 mm topsoil	**Total Landform Establishment:**	
It has been assumed that all material is required to be imported and no material is available on site.	**Total Growth Media Development:**	
	Total Ecosystem Establishment:	

Management Precinct	Activity / Description	Applicable (Y or N)	Quantity	Unit	Default Unit Rate	Alternative Unit Rate	Total Cost	Basis for Costs Estimation and Additional Relevant Information	Description / Notes:
Contaminated Materials	Undertake a preliminary site investigation (Phase 1). This accounts for current and historical locations where areas of disturbance are clustered. If there are multiple cluster areas on site, multiple studies may be required.	**Y**		Cluster	**$15,000**		**$0**		The preliminary investigation would include at minimum a desktop assessment of the area and site history, incidents, etc. as per the National Environmental Protection (Site Contamination) Measure (NEPM) Phase 1 assessment (EP Act Section 389 (2) (iv)) or similar approved and recognised assessment method. A cluster may include: - Mine infrastructure (i.e., fuel / chemical store, workshop, vehicle wash-down, sewage treatment etc.) - Processing plants (i.e., ore and product storage, mine waste storage and disposal, rail load-out etc.) - Remote pit-top facilities (i.e., vehicle re-fuel, sewage treatment, secondary workshop, chemical
	Undertake an intrusive site investigation. This accounts for current and historical locations where areas of disturbance are clustered. If there are multiple cluster areas on site, multiple intrusive investigations should be included.	**Y**		Cluster	**$100,000**		**$0**		The intrusive investigation would include at minimum a site walkover and field sampling as per the National Environmental Protection (Site Contamination) Measure (NEPM) Phase 2 intrusive investigation (EP Act Section 389 (2) (iv)) or similar approved and recognised assessment method. Note: An intrusive investigation is not required for all contaminated areas and should be applied considering the rehabilitation program, site history, location, etc. A cluster area where it is highly anticipated that contamination has occurred (i.e. underground tanks / pipes that are known to have leaked, chemical stores with earthen bunds, around ineffective oil/water separators etc.) and further field work is required.
	Removal and disposal of contaminated water from tanks, bunded areas and sumps	**Y**		L	**$0.35**		**$0**		Cost for recent sump clean-up from resource activity - requires specialists to treat.
	Remove material (carbonaceous / metalliferous spillage or otherwise) from footprint of the process facility (leach pads) / stockpile area (ROM product) / roads and dump in a void on-site (Select Haul Distance from list)	**Y**		m3	**Select from List**			**Select Haul Distance Here**	This item includes scraping and removal of the volume of carbonaceous material using dozer, grader etc. to make safe an area and enable the establishment of rehabilitation.
	Load, cart and dispose of High Level contaminated material off site to a licensed landfill. Assumes cartage to a licensed landfill	**Y**		m3	**$700.00**		**$0**		Includes load, haul and dump fees to a licensed facility.
	Load, cart and disposal of Low Level contaminated material off site to a licensed landfill. Add $50/m3 for cartage to regional landfill	**Y**		m3	**$200.00**		**$0**		Includes load, haul and dump fees to a licensed facility.
	Onsite remediation of hydrocarbon contaminated soils manual land farming (Select Volume from List)	**Y**		m3	**Select from List**			**Select Volume Here**	Spreading of contaminated soils on a prepared surface and stimulation of aerobic microbial activity within the soils through aeration and/or the addition of minerals, nutrients and moisture to promote the aerobic degradation of organic chemicals - time frame of up to 24 months.
	Mobilisation of cement stabilisation plant and equipment for hydrocarbon (i.e., PAH, long chain hydrocarbons, etc.) contaminated soil treatment	**Y**		Item	**$150,000**		**$0**		Required if treatment of hydrocarbon contamination is required to be fast tracked.
	On-site remediation of hydrocarbon contaminated soils - using a mobile treatment unit	**Y**		m3	**$165.00**		**$0**		Additional cost as the treatment process is fast tracked.
	Remove and dispose of asbestos (<750 m2)	**Y**		m2	**$50.00**		**$0**		Where an assessment/estimation has been made to confirm the volume of asbestos to be removed.
	Remove and dispose of asbestos (>750 m2)	**Y**		m2	**$40.00**		**$0**		Where an assessment/estimation has been made to confirm the volume of asbestos to be removed.
	Remove and dispose of asbestos	**Y**		tonne	**$2,400**		**$0**		6 mm asbestos sheet approx. 15 kg / m2 = ~70 m2 per ton. Allowing $20 / m2 for removal, 4 hours trucking @$125 and $100 / t disposal plus 20% OHP = $2,400 / t
	Treatment of known Acid Sulfate Soils	**Y**		ha	**$2,580**		**$0**		Assumes ASS is treatable via neutralisation and does not require capping and isolation.
	Removal and disposal of plastic liner (i.e. dam, leach pad, sump etc.)	**Y**		m2	**$1.00**		**$0**		Provisional sum for cutting using ripping tynes and on-site disposal of the liner.
						Contaminated Materials Subtotal	**$0**		
Roads and Tracks	Unsealed roads / vehicle park-up areas – minor works including deep rip and trim	**Y**		ha	**$960.00**		**$0**		Assumes ~6 m road width - 16H Grader @ $212 per hour.
	Unsealed roads / access tracks / vehicle park-up areas with windrows and/or small earthen bunds – minor earthworks and deep rip and trim	**Y**		ha	**$1,500**		**$0**		Assumes ~20 m road width - D10 Dozer @ $332 per hour.
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip and seed (pasture grass)	**Y**	0.47	ha	**$3,698**		**$1,753**	**Emplacement East Road and Lower Emplacement Road.**	D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	**Y**		ha	**$4,485**		**$0**		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.
	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (pasture grass)	**Y**		ha	**$3,820**		**$0**		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.

	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	Y		ha	$4,595		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.
	Remove stabilised material (blue metal, aggregate etc.) from roadways and disposal on-site/locally (haul distance < 1km)	Y	1422.3	m3	$4.45		$6,328	< =1km Scalp 0.3 m from road surfaces and dispose in emplacement: road to emplacement, Emplacement East Road and Lower Emplacement Road.	D10 Rip and push into void at $270/hr, 0.2ha/hr, 150mm deep. 657 Scrapers cut to spoil at $430/hr, 150BCM/hr/machine, Ancillary watercart and grader at $0.75c/m3
						Roads and Tracks Subtotal	$8,081		
Earthworks / Structural Works (Landform Establishment)	Major bulk pushing to achieve grades nominated in the approval/permit – Select Push Length	Y		m3	Select from List			Select Push Length Here	Major bulk pushing to achieve grades nominated in the approval/permit
	Minor reshaping and pushing	Y	2.8	ha	$3,900		$10,920	The emplacement is shaped and no areas require major pushing. 2.8 ha requires minor reshape within the ML boundary	D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation).
	Fill dams, voids etc. - Source local material, cart and spread to cap or backfill, cap thickness determined by approval / permit (Select Haul Distance from List)	Y		m3	Select from List			Select Haul Distance Here	This item includes the volume of material requiring backfill using an excavator and scraper to fill the void and enable the establishment of rehabilitation.
	Trim, rock rake & deep rip (includes levelling / landscaping and rip in 1 direction)	Y		ha	$960.00		$0		16H Grader @ $212 per hour - ripping in 1 direction only.
	Structural works, banks, waterways - contour banks, drainage channels and other soil conservation measures	Y		ha	$1,600		$0		Combination of dozer and excavator work. Small dozer (D6 or similar) @ ~$200 per hour plus grader @ $212 per hour for ~4 hours each per ha
	Construction of spine drains / drop structures and/or stabilising water course entry points - required for large catchments	Y		m2	$35.00		$0		Installation of on-site rock material (rip-rap) where managing water run-off from disturbed land and/or upon entry to water courses - prevents erosion of gully head (assumes competent material is locally available)

						Earthworks / Structural Works (Landform Establishment) Subtotal	$10,920		
Mine Waste	Reshaping, capping / sealing of a structure unlikely to present difficulties due to chemistry – reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), and physical properties (i.e., shear strength, etc.) - where the mine waste stream is geochemically benign and / or the strength condition within the upper 4 - 6 m meets the target shear strength profile.	Y	2.8	ha	$81,000		$226,800	Capping of the REA area within the ML As per consent material will be 300mm clay, 500mm subsoil and 150mm topsoil.	This includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume material with the appropriate chemical and physical properties. This rate assumes suitable capping material is available on site within 10 km, and an average cap thickness of approximately 1 m including growth media. Water quality from runoff, seepage etc. meets site-specific environment water quality values.
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Reshaping, capping / sealing of structure likely to present moderate difficulties due to chemistry – reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), or physical properties – shear strength, etc. limiting equipment choice.	Y		ha	$108,000		$0		This item includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume of material to cap / cover facilities where the tailings or rejects base is at a strength that enables economically efficient construction methods with small plant. This rate assumes suitable capping material is available on site within 10 km, and an average cap thickness of approximately 2 m including growth media. This may require additional materials (such as capillary breaks, geofabric, etc.), specific material types (e.g. acid neutralising / consuming materials, competent rock etc.) , and associated activities (i.e., load / haul / place / crush / screen / borrow etc.). Costs for haulage of specialised materials must be added separately if required.
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Reshaping, capping / sealing of structure likely to present considerable difficulties due to reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), and / or physical properties (low shear strength greatly limiting equipment selection for material placement etc.)	Y		ha	$170,000		$0		This item includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume of material to cap / cover facilities of high geochemical risk, and / or low shear strength that prohibits economically efficient construction methods. This rate assumes suitable capping material/s are available on site within 10 km, and an average cap thickness of approximately 2.5 m including growth media. This may require additional materials (i.e., capillary breaks, geofabric, etc.), specific material types (e.g. acid neutralising / consuming materials, competent rock etc.), and associated activities (i.e., load / haul / place / crush / screen / borrow etc.). Costs for haulage of specialised materials must be added separately if required.
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
						Mine Waste Subtotal	$226,800		
Land Preparation and Revegetation (Growth Media Development and Ecosystem Establishment)	Source, cart and spread growth media - haul distance >1 km but <2 km	Y	4200	m3	$3.91		$16,411	> 1km but < = 2km Source topsoil material for the capping of the REA area within the ML As per consent material will be 300mm clay, 500mm subsoil	550 m3/hr with 4 x 657 scrapers at $430/hr, D10 trimming at $270/hr 3ha/day at 150mm depth
	Direct seeding / fertiliser (pasture grass species)	Y	2.8	ha	$1,240		$3,472	Seeding of REA area within mining lease with pasture/cover crop seed	Rate can fluctuate however this is a suitable standard rate.
	Direct seeding / fertiliser (tree or native grass species)	Y		ha	$2,095		$0		Rate can fluctuate however this is a suitable standard rate.
	Hydro-seeding with straw mulching and bitumen tack	Y		m2	$1.80		$0		Rate can fluctuate however this is a suitable standard rate.
	Single application of fertiliser (pasture)	Y		ha	$420.00		$0		Assumes 250 kg / ha. These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
	Single application of fertiliser (trees)	Y		ha	$140.00		$0		These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
	Spoil amelioration (adding lime / gypsum etc.)	Y		ha	$860.00		$0		Assumes 2.5 t / ha as an average application rate.
	growth media amelioration with biosolids	Y		ha	$1,015		$0		Recent experience with agronomy projects.
	Construct no-climb stock fence around rehabilitated areas	Y		m	$9.50		$0		Standard rate for no-climb stock fencing.
	Construct standard stock fence around rehabilitated areas	Y	904	m	$4.00		$3,616	Construct fence around REA during rehab. Only accounted for length within ML	Standard rate for standard stock fencing.

	Purchase and erect warning signs	Y		allow	$250.00		$0		Compliance with AS 1319-1994 - Safety signs for the occupational environment - installed every 25 m.
	Supply from external sources virgin excavated natural material (VENM) for growth media.	Y		m3	$80.80		$0		D7 to spread material at $205/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $70/m3 for imported fill material.
	Supply from external sources a combination of virgin excavated natural material (VENM) and spoil from large excavation for filing voids and/or capping etc.	Y		m3	$72.50		$0		D10 push into void at $270/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $60/m3 for imported fill material.
Land Preparation and Revegetation (Growth Media Development and Ecosystem Establishment) Subtotal							**$23,499**		
Water Management	Clean water dams to be retained after decommissioning – make safe and minor earthworks	Y		allow	$2,500		$0		Provisional sum for earthworks and revegetation required to rehabilitate dam batters etc suitable for re-use by an alternate land-user - D6 Dozer (or similar) @ ~$200 per hour and pasture grass
	Remove sediments from the floor of the dam to enable it to be converted into clean water structure (Select Haul Distance from list)	Y		m3	Select from List			Select Haul Distance Here	This item includes the volume of contaminated sediment requiring removal using an excavator, truck and dozer to clean out the dam.
Water Management Subtotal							**$0**		
Maintenance of Rehabilitated Areas	Maintenance of areas that have been shaped and seeded and revegetation has been 'successful'	Y	10	ha	$900		$9,000	Maintenance of REA area within ML including 7.2 ha or previously rehabilitated area	Rehabilitation maintenance might include re-seeding, watering, fertilising, minor re-shaping, erosion control, inspections/audits - does not include major repair
	Existing rehabilitation repair - minor	Y	1	ha	$1,200		$1,200	Assume 10% of REA area will require minor repair	Areas requiring minor repair - rills, minor growth media replacement.
	Existing rehabilitation repair - moderate	Y		ha	$1,700		$0		Areas requiring moderate repair - rills, significant growth media replacement.
	Existing rehabilitation repair - major	Y		ha	$2,500		$0		Areas requiring major repair - rills, gullies, growth media replacement, some level of additional surface water management
	Existing rehabilitation repair - total failure of landform	Y		ha	$40,000		$0		Areas that require extensive rehabilitation repair - re-design and re-construction of landform.
Maintenance of Rehabilitated Areas Subtotal							**$10,200**		
Additional Items	Other 1 <insert>	N			This is				This item includes **<<to be added by the operator>>**
	Other 2 <insert>	N			deliberately				This item includes **<<to be added by the operator>>**
	Other 3 <insert>	N			left blank				This item includes **<<to be added by the operator>>**
Additional Items Subtotal							**$0**		
Total Cost for Tailings & Rejects Domain							**$279,500**		

Underground Operations

Domain 3a: Overburden & Waste

Total Cost for Overburden & Waste Domain **$0**

Additional Assumptions: *Record any relevant assumptions to this domain below:*

	Key Rehabilitation Area Data for Domain	**Enter data below manually**
	Total Landform Establishment:	
	Total Growth Media Development:	
	Total Ecosystem Establishment:	

Management Precinct	Activity / Description	Applicable (Y or N)	Quantity	Unit	Default Unit Rate	Alternative Unit Rate	Total Cost	Basis for Costs Estimation and Additional Relevant Information	Description / Notes:
Contaminated Materials	Treatment of known Acid Sulfate Soils	Y		ha	$2,580		$0		Assumes ASS is treatable via neutralisation and does not require capping and isolation.
	Removal and disposal of plastic liner (i.e. dam, leach pad, sump etc.)	Y		m2	$1.00		$0		Provisional sum for cutting using ripping tynes and on-site disposal of the liner.
						Contaminated Materials Subtotal	$0		
Roads and Tracks	Unsealed roads / vehicle park-up areas – minor works including deep rip and trim	Y		ha	$960.00		$0		Assumes ~6 m road width - 16H Grader @ $212 per hour.
	Unsealed roads / access tracks / vehicle park-up areas with windrows and/or small earthen bunds – minor earthworks and deep rip and trim	Y		ha	$1,500		$0		Assumes ~20 m road width - D10 Dozer @ $332 per hour.
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip and seed (pasture grass)	Y		ha	$3,698		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	Y		ha	$4,485		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.
	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (pasture grass)	Y		ha	$3,820		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.
	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	Y		ha	$4,595		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.
	Remove stabilised material (blue metal, aggregate etc.) from roadways and disposal on-site/locally (Select Haul Distance from list)	Y		m3	Select from List			Select Haul Distance Here	This item includes the scraping and removal of the volume of stabilised material from the road, laydown or other surface using an excavator, dozer and grader to enable the establishment of rehabilitation.
						Roads and Tracks Subtotal	$0		
Earthworks / Structural Works (Landform Establishment)	Major bulk pushing to achieve grades nominated in the approval/permit – Select Push Length	Y		m3	Select from List			Select Push Length Here	Major bulk pushing to achieve grades nominated in the approval/permit
	Minor reshaping and pushing	Y		ha	$3,900		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation).
	Fill dams, voids etc. - Source local material, cart and spread to cap or backfill, cap thickness determined by approval / permit (Select Haul Distance from List)	Y		m3	Select from List			Select Haul Distance Here	This item includes the volume of material requiring backfill using an excavator and scraper to fill the void and enable the establishment of rehabilitation.
	Shotcrete application on cuttings and steep slopes	Y		m2	$185.00		$0		This rate is used to rehabilitate steep slopes of weathered rock, roadway cuttings, etc that cannot be cut back and stabilised.
	Trim, rock rake & deep rip (includes levelling / landscaping and rip in 1 direction)	Y		ha	$960.00		$0		16H Grader @ $212 per hour - ripping in 1 direction only.
	Structural works, banks, waterways - contour banks, drainage channels and other soil conservation measures	Y		ha	$1,600		$0		Combination of dozer and excavator work. Small dozer (D6 or similar) @ ~$200 per hour plus grader @ $212 per hour for ~4 hours each per ha.
	Construction of spine drains / drop structures and/or stabilising water course entry points - required for large catchments	Y		m2	$35.00		$0		Installation of on-site rock material (rip-rap) where managing water run-off from disturbed land and/or upon entry to water courses - prevents erosion of gully head (assumes competent material is locally available).
						Earthworks / Structural Works (Landform Establishment) Subtotal	$0		
Mine Waste	Reshaping, capping / sealing of a structure unlikely to present difficulties due to chemistry – reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), and physical properties (i.e., shear strength, etc.) - where the mine waste stream is geochemically benign and / or the strength condition within the upper 4 - 6 m meets the target shear strength profile.	Y		ha	$81,000		$0		This includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume material with the appropriate chemical and physical properties. This rate assumes suitable capping material is available on site within 10 km, and an average cap thickness of approximately 1 m including growth media. Water quality from runoff, seepage etc. meets site-specific environment water quality values.
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.).
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.).

	Reshaping, capping / sealing of structure likely to present moderate difficulties due to chemistry – reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), or physical properties – shear strength, etc. limiting equipment choice.	Y		ha	$108,000		$0		This item includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume of material to cap / cover facilities where the tailings or rejects base is at a strength that enables economically efficient construction methods with small plant. This rate assumes suitable capping material is available on site within 10 km, and an average cap thickness of approximately 2 m including growth media. This may require additional materials (such as capillary breaks, geofabric, etc.), specific material types (e.g. acid neutralising / consuming materials, competent rock etc.) , and associated activities (i.e., load / haul / place / crush / screen / borrow etc.). Costs for haulage of specialised materials must be added separately if required.
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Reshaping, capping / sealing of structure likely to present considerable difficulties due to reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), and / or physical properties (low shear strength greatly limiting equipment selection for material placement etc.)	Y		ha	$170,000		$0		This item includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume of material to cap / cover facilities of high geochemical risk, and / or low shear strength that prohibits economically efficient construction methods. This rate assumes suitable capping material/s are available on site within 10 km, and an average cap thickness of approximately 2.5 m including growth media. This may require additional materials (i.e., capillary breaks, geofabric, etc.), specific material types (e.g. acid neutralising / consuming materials, competent rock etc.), and associated activities (i.e., load / haul / place / crush / screen / borrow etc.). Costs for haulage of specialised materials must be added separately if required.
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
						Mine Waste Subtotal	$0		
Land Preparation and Revegetation (Growth Media Development and Ecosystem Establishment)	Source, cart and spread growth media (Select Haul Distance from List)	Y		m3	Select from List			Select Haul Distance Here	If topsoil is not available on-site, then Virgin Excavated Natural Material (VENM) may need to be externally sourced.
	Planting mature trees (>15 cm)	Y		allow	$20.00		$0		4 m centres.
	Planting tube stock (<15 cm)	Y		allow	$10.00		$0		4 m centres.
	Direct seeding / fertiliser (pasture grass species)	Y		ha	$1,240		$0		Rate can fluctuate however this is a suitable standard rate.
	Direct seeding / fertiliser (tree or native grass species)	Y		ha	$2,095		$0		Rate can fluctuate however this is a suitable standard rate.
	Hydro-seeding with straw mulching and bitumen tack	Y		m2	$1.80		$0		Rate can fluctuate however this is a suitable standard rate.
	Single application of fertiliser (pasture)	Y		ha	$420.00		$0		Assumes 250 kg / ha. These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
	Single application of fertiliser (trees)	Y		ha	$140.00		$0		These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
	Spoil amelioration (adding lime / gypsum etc.)	Y		ha	$860.00		$0		Assumes 2.5 t / ha as an average application rate.
	growth media amelioration with biosolids	Y		ha	$1,015		$0		Recent experience with agronomy projects.
	Construct no-climb stock fence around rehabilitated areas	Y		m	$9.50		$0		Standard rate for no-climb stock fencing.
	Construct standard stock fence around rehabilitated areas	Y		m	$4.00		$0		Standard rate for standard stock fencing.
	Purchase and erect warning signs	Y		allow	$250.00		$0		Compliance with AS 1319-1994 - Safety signs for the occupational environment - installed every 25 m.
	Supply from external sources virgin excavated natural material (VENM) for growth media.	Y		m3	$80.80		$0		D7 to spread material at $205/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $70/m3 for imported fill material
	Supply from external sources a combination of virgin excavated natural material (VENM) and spoil from large excavation for filing voids and/or capping etc.	Y		m3	$72.50		$0		D10 push into void at $270/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $60/m3 for imported fill material
						Land Preparation and Revegetation (Growth Media Development and Ecosystem Establishment) Subtotal	$0		
Water Management	Clean water dams to be retained after decommissioning – make safe and minor earthworks	Y		allow	$2,500		$0		Provisional sum for earthworks and revegetation required to rehabilitate dam batters etc suitable for re-use by an alternate land-user - D6 Dozer (or similar) @ ~$200 per hour and pasture grass
	Remove sediments from the floor of the dam to enable it to be converted into clean water structure (Select Haul Distance from list)	Y		m3	Select from List			Select Haul Distance Here	This item includes the volume of contaminated sediment requiring removal using an excavator, truck and dozer to clean out the dam.
						Water Management Subtotal	$0		

Maintenance of Rehabilitated Areas	Maintenance of areas that have been shaped and seeded and revegetation has been 'successful'	**Y**		ha	**$900.00**		**$0**		Rehabilitation maintenance might include re-seeding, watering, fertilising, minor re-shaping, erosion control, inspections/audits - does not include major repair
	Existing rehabilitation repair - minor	**Y**		ha	**$1,200**		**$0**		Areas requiring minor repair - rills, minor growth media replacement.
	Existing rehabilitation repair - moderate	**Y**		ha	**$1,700**		**$0**		Areas requiring moderate repair - rills, significant growth media replacement.
	Existing rehabilitation repair - major	**Y**		ha	**$2,500**		**$0**		Areas requiring major repair - rills, gullies, growth media replacement, some level of additional surface water management.
	Existing rehabilitation repair - total failure of landform	**Y**		ha	**$40,000**		**$0**		Areas that require extensive rehabilitation repair - re-design and re-construction of landform.
Maintenance of Rehabilitated Areas Subtotal							**$0**		
Additional Items	Other 1 <insert>	**N**			**This is**				This item includes **<<to be added by the operator>>**
	Other 2 <insert>	**N**			**deliberately**				This item includes **<<to be added by the operator>>**
	Other 3 <insert>	**N**			**left blank**				This item includes **<<to be added by the operator>>**
Additional Items Subtotal							**$0**		
Total Cost for Overburden & Waste Domain							**$0**		

Underground Operations

Domain 4a: Subsidence and Management

Total Cost for Subsidence and Management Activities **$1,043,062**

Additional Assumptions: *Record any relevant assumptions to this domain below:*

Sundry items herein account for the entire Russell Vale Colliery	**Key Rehabilitation Area Data for Domain**	**Enter data below manually**
	Total Landform Establishment:	
	Total Growth Media Development:	
	Total Ecosystem Establishment:	

Management Precinct	Activity / Description	Applicable (Y or N)	Quantity	Unit	Default Unit Rate	Alternative Unit Rate	Total Cost	Basis for Costs Estimation and Additional Relevant Information	Description / Notes:
Subsidence Repairs	Minor stabilisation works and maintenance of mine subsidence areas - ripping etc.	Y		ha	$1,500		$0		D8 Dozer @ $240 per hour and/or grader @ $160 per hour.
	Crack filling to repair subsidence impacts	Y		m	$1,485		$0		Undertake more substantial works to backfill cracks and/or sink holes (e.g., filling with mulch prior to grouting, grouting, etc.)
	Water course restoration to repair subsidence impacts	Y		allow	Use alternate rate cell		$0		Undertake more substantial works to remediate water courses (e.g., channel bed repairs, rock bar repairs, swamp stabilisation etc.)
	Create cut-through to re-establish natural water courses/drainage channels following subsidence	Y		allow	$3,000		$0		Includes all earthworks and revegetation required to re-establish the natural drainage profile of the subsided area.
						Subsidence Repairs Subtotal	$0		
Vents, Shafts and Boreholes	Maintenance and monitoring of sealed adits/portals and shafts (for a total of 5 years)	Y	7	allow	$25,000		$175,000	**Maintenance and monitoring of 7 sealed portals and ventilation shafts**	Estimate to undertake periodic inspections by a qualified person and provide a completions report for DRG sign-off.
						Vents, Shafts and Boreholes Subtotal	$175,000		
Water Management	On-site treatment of contaminated water due to high salt (includes removal of metals etc, brine disposal and cost of mobile water treatment unit)	Y		ML	$3,600		$0		Rate can fluctuate depending on treatment type however this is a suitable standard rate for current programs at mining operations.
	On-site treatment of contaminated water due to low pH (incudes removal of metals etc, neutralisation treatments and cost of mobile water treatment unit	Y		ML	$1,500		$0		Rate can fluctuate depending on treatment type however this is a suitable standard rate for current programs at mining operations.
						Water Management Subtotal	$0		
Creek Diversions	Repairs and/or stabilisation of new or compromised water course diversion	Y		m	$2,500		$0		Assumes material is suitable for revegetating and has a reasonable chance of stabilising.
	Long term maintenance of water course diversion – Channel constructed through backfilled material	Y		m	$1,500		$0		Assumes maintenance has been kept up and significant works are not required.
	Long term maintenance of water course diversion – Channel constructed through competent material	Y		m	$750.00		$0		Assumes maintenance has been kept up and significant works are not required.
	Installation of rock armouring	Y		m2	$6.00		$0		Assumes competent material is locally available - multiply costs by 2 for sourcing and transporting from offsite location.
						Creek Diversions Subtotal	$0		
Land Management	Pest management on buffer lands, non-disturbed, and rehabilitated areas	Y		ha	$150.00		$0		Feral animal baiting programs if required and waste materials required to be removed.
	Land management of undisturbed areas (rehabilitation, weeds, ferals, erosion and sediment control works)	Y	45.15	ha	$400.00		$18,062	**Land maintenance of the areas within the Pit Top area not requiring rehabilitation. Total pit top area (52.8ha) minus rehabilitation area (7.65**	Undisturbed areas within the lease boundary that require land management activities.
						Land Management Subtotal	$18,062		
Heritage Items	The restoration and care and maintenance of items that have heritage significance	Y	1	allow	Use alternate rate cell	$50,000	$50,000	**Provisional sum for preservation works, recordings, archival, etc. to restore and undertake care and maintenance of items that have historical significance and are not to be retained after the cessation of mining related to heritage listed portals and adits**	Item for the redistribution of Aboriginal artefacts, preservation of European heritage items or a combination of activities.
						Heritage Items Subtotal	$50,000		
Sundry Items	Development of an 'Unplanned' Project Closure Plan - State Significant Development	Y	1	allow	$100,000		$100,000	**SSD** **Preparation of closure plan for the Russell Vale Colliery**	Provisional sum to be used to refine the conceptual closure plan into a detailed closure plan with execution strategies for rehabilitation activities.
	DRG tender preparation and assessment, stakeholder consultation, risk assessment facilitation and management, statutory reporting and instruments, permitting and compliance requirements, document and data management	Y	5	allow	Use alternate rate cell	$20,000	$100,000	**Provisional amount for all statutory requirements during closure. 5 years at $20,000**	Provisional sum for the NSW Government to prepare tender documentation (i.e. demolition, waste disposal, earthworks, environmental management etc.) manage stakeholders and establish permitting and compliance requirements for closure.
	Site security during closure	Y	5	yr.	$75,000		$375,000	**Provisional sum for site security measures required during closure (i.e., night patrols)**	Provisional sum for site security measures required during closure. This includes nightly patrols and first response in the event of an out of hours incident.
	HAZMAT Clean-up - cleaning and decontaminating plant and equipment, chemical storage locations, oil and grease traps, tanks, vessels, and pipe work etc	Y	1	allow	$100,000		$100,000	**Provisional sum to perform the site clean-up and ensuring the demolition program is not interrupted due to potential contamination of waste streams**	Provisional sum to perform the site clean-up and ensuring the demolition program is not interrupted due to potential contamination of waste streams.
	Removal and disposal of radiation devices	Y	1	each	$25,000		$25,000	**Removal of radiation device at the Pit Top**	Provisional sum for removal and disposal of monitoring devices on conveyors using a radiation source (i.e., Americium – 241, Plutonium – 238, Caesium - 137 etc)
	Additional fees for accessing State, Crown or other public lands for rehabilitation/remediation activities	Y		allow	Use alternate rate cell		$0		Provisional sum.
						Sundry Items Subtotal	$700,000		

Mobilisation and Demobilisation	Mobilisation & Demobilisation for small mine or quarry	**Y**		Item	**$40,000**		**$0**		May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
	Mobilisation & Demobilisation (Distance to site <150 km)	**Y**	1	item	**$100,000**		**$100,000**	**Mobilsation assumed from Sydney**	May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
	Mobilisation & Demobilisation (Distance to site >150 km but <500 km)	**Y**		item	**$150,000**		**$0**		May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
	Mobilisation & Demobilisation (Distance to site >500 km but <1000 km)	**Y**		item	**$300,000**		**$0**		May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
	Mobilisation & Demobilisation (Distance to site >1000 km)	**Y**		item	**$500,000**		**$0**		May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
						Mobilisation and Demobilisation Subtotal	**$100,000**		
Additional Items	Other 1 <insert>	**N**			**This is**				This item includes **<<to be added by the operator>>**
	Other 2 <insert>	**N**			**deliberately**				This item includes **<<to be added by the operator>>**
	Other 3 <insert>	**N**			**left blank**				This item includes **<<to be added by the operator>>**
						Additional Items Subtotal	**$0**		
Total Cost for Subsidence and Management Activities							**$1,043,062**		

Underground Operations

Domain 1b: Infrastructure

Total Cost for Infrastructure Domain **$1,471,219**

Additional Assumptions: *Record any relevant assumptions to this domain below:*

The Shaft 4 pit top will be rehabilitated to native vegetation at closure	**Key Rehabilitation Area Data for Domain**	**Enter data below manually**
All infrastructure will be demolished and removed	**Total Landform Establishment:**	
The access road will be retained for SCA access	**Total Growth Media Development:**	
Assumed all dams will be backfilled and rehabilitated with the exception of the collection dam which will be retained for fire management and SCA use	**Total Ecosystem Establishment:**	

Management Precinct	Activity / Description	Applicable (Y or N)	Quantity	Unit	Default Unit Rate	Alternative Unit Rate	Total Cost	Basis for Costs Estimation and Additional Relevant Information	Description / Notes:
Termination of Services and Demolition Works	Disconnect and terminate all services (Water, electricity, gas etc at point of attachment to site)	Y	1	allow	$35,000		$35,000	Disconnect services at Shaft 4 site	For disconnection of all services, at building boundaries, physical cut at the point of attachment or distribution location. If infrastructure is not consolidated (i.e., administration, camp and workshops are in separate places), consider multiple disconnection fees
	Disconnect and terminate services at remote areas (i.e. pump stations, remote workshops, sewage treatment plant etc.)	y		allow	$5,500		$0		Used for infrastructure remote from primary connection. Can also be used for small mines / quarries that do not have dedicated supplies from supply authorities such as steel lattice power lines
	Removal of low/medium voltage powerlines including disconnection, rolling up the wires and removing the poles - does not include the removal of	Y		km	$15,000		$0		Applies to power lines on stobie, concrete or similar poles.
	Removal of power lines on tower or lattice structures (this includes disconnection, rolling up the wires and removing the structures) - does not include the removal of substations	Y		km	$100,000		$0		Applies to power lines on steel tower and steel lattice structures assuming 3 towers / km.
	Remove significant rail, road, water course overpass - manage potential interuptions and demolish and remove bridge supports/pylons/bridge structure etc. and dispose of waste material on-site/locally	Y		Item	$350,000		$0		Major structures constructed for the purposes of mining related works - does not include transport to regional disposal facility or equivalent
	Demolish and/or remove substations (assumes they are in a closed building). Dispose of waste material on-site/locally	Y	368	m2	$600.00		$220,800	Demolition of Shaft 4 substation and transformer yard	Simple structure to demolish. Assumes single story building and segregation of contents for scrap as applicable
	Demolish and remove switchyard. Dispose of waste material on-site/locally	Y		m2	$55.00		$0		Includes demolition and removal of all switchgear and transformers etc. and segregation of contents for scrap as applicable
	Demolish and remove demountable structures on concrete stumps. Assumes not being re-used	Y	327	m2	$40.00		$13,080	One demountable on site 327 m2.	Crib huts, temporary offices and other 'non permanent' structures. Does not include transport to regional disposal facility or equivalent
	Demolish and remove small buildings/tanks (admin buildings, single story accommodation etc) and disposal on-site/locally	Y	3966.3	m2	$65.00		$257,810	Small buildings at Shaft 4 include workshop shed (38.6m2), pump house (44.6m2), control room (39.9m2), bathhouse and main office (3723.4m2), fire and diesel fuel areas (59.5m2). Includes magazine building (10.5m2)	Simple structure to demolish, assumes no greater than 2 stories high. Does not include transport to regional disposal facility or equivalent.
	Demolish and remove light industrial buildings and disposal on-site/locally	Y	837.7	m2/floor	$115.00		$96,336	Light industrial building is the Workshop and switchroom. 266m2 * 2 floors and shaft 4 building 3 storeys (100.9m2*3 floors)	Needs to be calculated per floor/level (Assume 1 floor/level = 3-4 m). Does not include transport to regional disposal facility or equivalent.
	Demolish and remove industrial buildings (workshops tyre change and servicing area etc not CHPP/process plant) and disposal on-site/locally	Y		m2/floor	$180.00		$0		Needs to be calculated per floor/level (Assume 1 floor/level = 3-4 m). Does not include transport to regional disposal facility or equivalent
	Demolish and remove CHPP/process plant (include the area of each floor of the structure) and disposal on-site/locally	Y		m2/floor	$265.00		$0		Needs to be calculated per floor/level (Assume 1 floor/level = 3-4 m). Does not include transport to regional disposal facility or equivalent
	Collapse, demolish and remove washery, crushers, hoppers, mills, furnaces, agglomeration, electrowinning, floatation, sizing stations, rotary breakers, etc (include the area of each floor of the structure) and disposal on-site/locally	Y		m2/floor	$265.00		$0		Needs to be calculated per floor/level (Assume 1 floor/level = 3-4 m). Does not include transport to regional disposal facility or equivalent
	Collapse, demolish and remove stacker OR reclaimer (radial or luffing etc. with maneuverability for stockpile control) and disposal on-site/locally	Y		allow	$1,000,000		$0		Cost for removal of stacker or reclaim unit only. Does not include terminate services, remove rails and ballast etc. Does not include transport to regional disposal facility or equivalent
	Collapse, demolish and remove bucket wheel stacker/reclaimer and disposal on-site/locally	Y		allow	$2,500,000		$0		Cost for just removal of the bucket wheel stacker/reclaim units. Does not include terminate services, remove rails and ballast etc. Does not include transport to regional disposal facility or equivalent
	Remove stacker/reclaimer rails and ballast and demolish and remove concrete footings etc and disposal on-site/locally	Y		m	$75.00		$0		Includes both rails, does not include the conveyor system. Does not include transport to regional disposal facility or equivalent.
	Collapse, Cut and Remove 5000T coal silo and disposal on-site/locally	Y		allow	$100,000		$0		Collapse structure and remove. Does not include transport to regional disposal facility or equivalent.
	Collapse, Cut and Remove 3000 T coal silo and disposal on-site/locally	Y		allow	$85,000		$0		Collapse structure and remove. Does not include transport to regional disposal facility or equivalent.
	Collapse, Cut and Remove 1250 T coal silo and disposal on-site/locally	Y		allow	$65,000		$0		Collapse structure and remove. Does not include transport to regional disposal facility or equivalent.
	Collapse, Cut and Remove rail loading bins and disposal on-site/locally	Y		allow	$65,000		$0		Collapse structure and remove. Does not include transport to regional disposal facility or equivalent.
	Demolish and remove onground conveyors, transfer stations & gantries (scrap only – does not include dismantling for reuse at another site) and disposal on-site/locally	Y		m	$210.00		$0		Estimate for on-ground conveyor including anything up to 10 m off the ground. Does not include transport to regional disposal facility or equivalent
	Demolish and remove elevated conveyors, transfer stations & gantries (scrap only, does not include dismantling for reuse at another site) and disposal on-site/locally	Y		m	$370.00		$0		Estimate for elevated conveyor up to ~10 m off the ground. Does not include transport to regional disposal facility or equivalent.

		Demolish and remove overhead conveyors, transfer stations & gantries (scrap only, does not include dismantling for reuse at another site) and disposal on-site/locally. This may include small scale fixed material stacking infrastructure	Y		m	$1,200		$0		Estimate for overhead conveyor including conveyors that are >10 m off the ground that require a crane to remove. Does not include transport to regional disposal facility or equivalent.
		Demolish reclaim tunnel, cut reo and expose reclaim conveyor, then collapse into the reclaim tunnel void (Does not include excavation to expose reclaim tunnel, removal of conveyor or backfilling void)	Y		m2	$80.00		$0		Does not include conveyor removal or backfill.
		Remove and demolish conveyor from reclaim tunnel (Does not include excavation and demolition of reclaim tunnel roof)	Y		m	$150.00		$0		Due to no canopy or infrastructure attached.
		Demolition of reclaim tunnel concrete (Assumes complete removal and dumping in mine pit void)	Y		m	$950.00		$0		Assumes this area will be used for another land-use that requires the structure to be dug up and re-buried somewhere else.
		Demolish and remove small tank clean (Thickener etc 3 - 9 m diameter) and disposal on-site/locally	Y	3	allow	$10,000		$30,000	Remove 3 high level water tanks 3m diameter	Assume tank is clean - contents removed. If tank is full allow extra 30% for excavator and 2 men to dig out and dispose. Does not include transport to regional disposal facility or equivalent.
		Demolish and remove medium tank clean (Thickener etc 10 - 15 m diameter) and disposal on-site/locally	Y	1	allow	$30,000		$30,000	Water Tank is approximately 14 m in diameter.	Assume tank is clean - contents removed. If tank is full allow extra 30% for excavator and 2 men to dig out and dispose. Does not include transport to regional disposal facility or equivalent.
		Demolish and remove large tank clean (Thickener etc 15 - 30 m diameter) and disposal on-site/locally	Y		allow	$45,000		$0		Assume tank is clean - contents removed. If tank is full allow extra 30% for excavator and 2 men to dig out and dispose. Does not include transport to regional disposal facility or equivalent.
		Demolish and remove extra large tank clean (Thickener etc >30 m diameter) and disposal on-site/locally	Y		allow	$85,000		$0		Assume tank is clean - contents removed. If tank is full allow extra 30% for excavator and 2 men to dig out and dispose. Does not include transport to regional disposal facility or equivalent.
		Demolish and remove tank clean (Thickener etc) >50 m diameter and disposal on-site/locally	Y		allow	$100,000		$0		Estimate only - may require a detailed assessment from demolition expert due to specialised equipment required for removal. Does not include transport to regional disposal facility or equivalent.
		Removal of UG tank <5000 L - including pipes, bunds etc. and disposal on-site/locally	Y	1	allow	$21,000		$21,000	Removal of UG deisel tank from shaft 4 area	Assume tank is clean (contents removed), does not include transport to regional disposal facility or equivalent.
		Removal of UG tank 5000 L - 15000 L - including pipes, bunds etc. and disposal on-site/locally	Y		allow	$30,000		$0		Assume tank is clean (contents removed), does not include transport to regional disposal facility or equivalent.
		Remove small underground pipe and disposal on-site/locally	Y		m	$25.00		$0		For example: 300 mm pipes - 0.5 m deep, does not include transport to regional disposal facility or
		Remove medium underground pipe and disposal on-site/locally	Y	370	m	$60.00		$22,200	Assume ~50% of pipes including irrigation line (total 739 m) are 500 mm pipes removed to 1 m depth	For example: 500 mm pipes - 1 m deep, does not include transport to regional disposal facility or equivalent.
		Remove large underground pipe and disposal on-site/locally	Y	370	m	$165.00		$61,050	Assume ~50% of pipes including irrigation line (total 739 m) are 1 m pipes removed to 2 m depth	For example: 1 m pipes - 2 m deep.
		Remove above ground pipe (supported) and disposal on-site/locally	Y		m	$12.00		$0		~300 mm pipes and assumes pipes are in close proximity to infrastructure areas. Does not include transport to regional disposal facility or equivalent.
		Remove surface pipelines (unsupported) and disposal on-site/locally	Y		m	$15.00		$0		~300 mm pipes and assumes pipes are used for water transfer
		Remove pump and pontoon from a lake or dam including pipes and electrical supply or diesel tank/s and disposal on-site/locally	Y		allow	$150,000		$0		Assumes infrastructure is moored and requires barge mobilisation to sever the mooring and / or is a significant fixed structure for controlled release of water. Does not include transport to regional disposal facility or equivalent.
		Remove bitumen (car park and access roads) and dispose on-site/locally	Y	6425	m2	$10.00		$64,250	Scalp bitumen (6425m2) across site and load into void (No 4 shaft) . Note the access road will be retained.	Scalp bitumen and stabilised material. Generally haulage rates will be $0.60 - $1.20 / km, depending on truck fleet, loaders etc. For off-site disposal use alternate rate option and add $0.90 / km for transport
		Remove bitumen (airstrip) and dispose on-site/locally	Y	1679	m2	$20.00		$33,580	Scalp bitumen and stabilised material from the helipad (1679m2) and load into void.	Scalp bitumen and stabilised material. Generally haulage rates will be $0.60 - $1.20 / km, depending on truck fleet, loaders etc. For off-site disposal use alternate rate option and add $0.90 / km for transport
		Remove concrete pads & footings (<300 mm thickness) and disposal on-site/locally	Y	4502.63	m2	$37.00		$166,597	Assumes small building footprint plus 10% to account for aprons etc Includes additional concrete area near workshop	Breaking up slab and disposal or for conversion to aggregate. Generally haulage rates will be $0.60 - $1.20 / km, depending on truck fleet, loaders etc. For off-site disposal use alternate rate option and add $0.90 / km for transport
		Remove concrete pads & footings (>300 mm thickness) and disposal on-site/locally	Y	292.6	m2	$75.00		$21,945	Assumes small industrial building footprint plus 10% to account for aprons etc	Breaking up slab and disposal or for conversion to aggregate. Generally haulage rates will be $0.60 - $1.20 / km, depending on truck fleet, loaders etc. For off-site disposal use alternate rate option and add $0.90 / km for transport
		Crush concrete to make road aggregate - 75 mm	Y		tonne	$17.00		$0		Does not include haulage of materials - assumes crushing plant is readily available.
		Crush concrete to make road aggregate - 50 mm	Y		tonne	$20.00		$0		Does not include haulage of materials - assumes crushing plant is readily available.
		Crush concrete to make road aggregate - 30 mm	Y		tonne	$22.00		$0		Does not include haulage of materials - assumes crushing plant is readily available.
		Remove fence (cyclone/wire fence) and disposal on-site/locally	Y	1342	m	$20.00		$26,840	Roll up perimeter fence around the site (917m), magazine fence (111m) and internal pond fence (314m) and remove posts.	Roll up fence and remove posts.
							Termination of Services and Demolition Works Subtotal	$1,100,487		
Rail Infrastructure		Remove rail loop and spur, ballast etc. and disposal on-site/locally	Y		m	$60.00		$0		Remove all materials to allow area to be reshaped and rehabilitated - does not include transport to regional disposal facility or equivalent.

	Remove train loading facilities and disposal on-site/locally	Y		m2	$265.00		$0		Remove rail load point infrastructure including gantries and control structures. Does not include transport to regional disposal facility or equivalent.
	Reshape rail spur and load out areas. Does not include growth media and revegetation	Y		ha	$2,500		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation).
						Rail Infrastructure Subtotal	$0		
Contaminated Materials	Undertake a preliminary site investigation (Phase 1). This accounts for current and historical locations where areas of disturbance are clustered. If there are multiple cluster areas on site, multiple studies may be required.	Y	1	Cluster	$15,000		$15,000	Cost for a general phase 1 assessment of a mine infrastructure area. Assess oil-water separator area and underground diesel tank area.	The preliminary investigation would include at minimum a desktop assessment of the area and site history, incidents, etc. as per the National Environmental Protection (Site Contamination) Measure (NEPM) Phase 1 assessment (EP Act Section 389 (2) (iv)) or similar approved and recognised assessment method. A cluster may include: - Mine infrastructure (i.e., fuel / chemical store, workshop, vehicle wash-down, sewage treatment etc.) - Processing plants (i.e., ore and product storage, mine waste storage and disposal, rail load-out etc.) - Remote pit-top facilities (i.e., vehicle re-fuel, sewage treatment, secondary workshop, chemical
	Undertake an intrusive site investigation. This accounts for current and historical locations where areas of disturbance are clustered. If there are multiple cluster areas on site, multiple intrusive investigations should be included.	Y	1	Cluster	$100,000		$100,000		The intrusive investigation would include at minimum a site walkover and field sampling as per the National Environmental Protection (Site Contamination) Measure (NEPM) Phase 2 intrusive investigation (EP Act Section 389 (2) (iv)) or similar approved and recognised assessment method. Note: An intrusive investigation is not required for all contaminated areas and should be applied considering the rehabilitation program, site history, location, etc. A cluster area where it is highly anticipated that contamination has occurred (i.e. underground tanks / pipes that are known to have leaked, chemical stores with earthen bunds, around ineffective oil/water separators etc.) and further field work is required.
	Removal and disposal of contaminated water from tanks, bunded areas and sumps	Y		L	$0.35		$0		Cost for recent sump clean-up from resource activity - requires specialists to treat.
	Remove material (carbonaceous / metalliferous spillage or otherwise) from footprint of the process facility (leach pads) / stockpile area (ROM product) / roads and dump in a void on-site (Select Haul Distance from list)	Y		m3	Select from List			Select Haul Distance Here	This item includes scraping and removal of the volume of carbonaceous material using dozer, grader etc. to make safe an area and enable the establishment of rehabilitation.
	Load, cart and dispose of High Level contaminated material off site to a licensed landfill. Assumes cartage to a licensed landfill	Y		m3	$700.00		$0		Includes load, haul and dump fees to a licensed facility.
	Load, cart and disposal of Low Level contaminated material off site to a licensed landfill. Add $50/m3 for cartage to regional landfill	Y	105	m3	$200.00		$21,000	Assumed nominal 100m3 of hydrocarbon contaminated soil at Shaft 4 and 5m3 of nitrate contaminated soil at magazine	Includes load, haul and dump fees to a licensed facility.
	Onsite remediation of hydrocarbon contaminated soils manual land farming (Select Volume from List)	Y		m3	Select from List			Select Volume Here	Spreading of contaminated soils on a prepared surface and stimulation of aerobic microbial activity within the soils through aeration and/or the addition of minerals, nutrients and moisture to promote the aerobic degradation of organic chemicals - time frame of up to 24 months.
	Mobilisation of cement stabilisation plant and equipment for hydrocarbon (i.e., PAH, long chain hydrocarbons, etc.) contaminated soil treatment	Y		Item	$150,000		$0		Required if treatment of hydrocarbon contamination is required to be fast tracked.
	On-site remediation of hydrocarbon contaminated soils - using a mobile treatment unit	Y		m3	$165.00		$0		Additional cost as the treatment process is fast tracked.
	Remove and dispose of asbestos (<750 m2)	Y		m2	$50.00		$0		Where an assessment/estimation has been made to confirm the volume of asbestos to be removed.
	Remove and dispose of asbestos (>750 m2)	Y		m2	$40.00		$0		Where an assessment/estimation has been made to confirm the volume of asbestos to be removed.
	Remove and dispose of asbestos	Y		tonne	$2,400		$0		6 mm asbestos sheet approx. 15 kg / m2 = ~70 m2 per ton. Allowing $20 / m2 for removal, 4 hours trucking @$125 and $100 / t disposal plus 20% OHP = $2,400 / t
	Treatment of known Acid Sulfate Soils	Y		ha	$2,580		$0		Assumes ASS is treatable via neutralisation and does not require capping and isolation.
	Removal and disposal of plastic liner (i.e. dam, leach pad, sump etc.)	Y		m2	$1.00		$0		Provisional sum for cutting using ripping tynes and on-site disposal of the liner.
						Contaminated Materials Subtotal	$136,000		
Vents, Shafts and Boreholes	Seal portals / drifts (width >3 m) – backfill the access for at least 50 m against a concrete bulk head with drainage slots. The rate includes some reshaping of batters around the adit entrance. If concrete bulk head not required, reduce rate by 25%	Y		allow	$250,000		$0		Cost estimated from planned and executed works programs in NSW from multiple sites. Rate accounts for a range of factors including variations in depth and size, accessability limitations, requirements for extra roof and/or rib support, equipment transport into the underground etc.
	Seal small adits (width <3 m) – install 0.5 concrete plug 3 m back from adit and backfill with appropriate material. The rate includes some reshaping of the batter around the entrance of the adit	Y		allow	$25,000		$0		Cost estimated from planned and executed works programs in NSW from multiple sites. Rate assumes standard works program with suitable access, and additional roof and rib stabilisation works etc. is not required.
	Seal and rehabilitate ventilation fans shafts - allows for works in a remote location	Y	1	allow	$150,000		$150,000	Full sealing and rehabilitation required including concrete bulkhead for No 4 shaft. Abby cost had 250k	Cost estimated from planned and executed works programs in NSW from multiple sites. Rate accounts for a range of factors including variations in depth and size, accessability limitations, equipment transport to the shaft etc.

		Install gate or grill over the adit (Where site might be used by bats)	Y		Item	$200,000		$0		Rate accounts for a range of factors including establishing clear access, and/or working in remote locations without services, and/or stabilisation works to prevent the entry collapsing and compromising the gate etc.
		Exploration boreholes – rehabilitate boreholes and drill pads as required	Y		depth (m)	$40.00		$0		Where multiple boreholes exist, this is the rate for the total cumulative depth of all boreholes (e.g. two boreholes at 100m depth each = 200m). Assumes a per metre drilling rate of ~$150 / m of which ~25 - 30% is for rehabilitation which may include a variety of works (i.e., cut casing and install cap, install poly pipe to facilitate back-filling, grout preparation, grouting and capping, reshaping / ripping the drill pad, amelioration / seeding etc.)
		Exploration boreholes – backfill open bore holes with cuttings	Y		allow	$300.00		$0		May include cutting of casing, installation of a casing cap, and/or manually backfilling the hole with drill cuttings. Does not include reshaping / ripping the drill pad, amelioration / seeding etc.
		Exploration boreholes – grout and cap open bore holes	Y		allow	$7,950		$0		Includes grouting and capping 100 - 200 m exploration boreholes to meet the requirements of EDG01.
		Boreholes – cap and seal open bore holes with steel casing (i.e., goaf drainage etc.)	Y		allow	$6,960		$0		Holes deeper than 100 m - includes cutting steel collar 6 m below surface, grouting and
		Boreholes – cap and seal open bore holes - surface-to-in-seam gas drainage	Y		allow	$15,000		$0		Surface-to-in-seam gas drainage boreholes.
		Boreholes – cap and seal open bore holes - vertical gas drainage	Y		allow	$16,000		$0		Vertical gas drainage boreholes.
		Boreholes – grout (with concrete) cap and seal bore holes (i.e. where sealing aquifers)	Y		allow	$35,000		$0		Includes multi skin sleaves to prevent aquifer mixing.
		Boreholes – cap and seal service boreholes for UG operations	Y		allow	$45,000		$0		Includes large diameter boreholes used for supplying electricity (66kV), compressed air, water, solsenic etc.
						Vents, Shafts and Boreholes Subtotal		**$150,000**		
Roads and Tracks		Unsealed roads / vehicle park-up areas – minor works including deep rip and trim	Y		ha	$960.00		$0		Assumes ~6 m road width - 16H Grader @ $212 per hour.
		Unsealed roads / access tracks / vehicle park-up areas with windrows and/or small earthen bunds – minor earthworks and deep rip and trim	Y		ha	$1,500		$0		Assumes ~20 m road width - D10 Dozer @ $332 per hour.
		Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip and seed (pasture grass)	Y		ha	$3,698		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.
		Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	Y		ha	$4,485		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.

	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (pasture grass)	Y		ha	$3,820		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.
	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	Y		ha	$4,595		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.
	Remove stabilised material (blue metal, aggregate etc.) from roadways and disposal on-site/locally (haul distance < 1km)	Y	1110.6	m3	$4.45		$4,941	< =1km Scalp 0.3 m from road surfaces (3702m2) and dispose in No 4 shaft.	D10 Rip and push into void at $270/hr, 0.2ha/hr, 150mm deep. 657 Scrapers cut to spoil at $430/hr, 150BCM/hr/machine, Ancillary watercart and grader at $0.75c/m3
						Roads and Tracks Subtotal	$4,941		
Earthworks / Structural Works (Landform Establishment)	Major bulk pushing to achieve grades nominated in the approval/permit – 50 m push length	Y		m3	$0.80		$0	< 50m push	D11 push at $350 and 400 bcm/hr
	Minor reshaping and pushing	Y		ha	$3,900		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation).
	Fill dams, voids etc. - Source local material, cart and spread to cap or backfill, cap thickness determined by approval / permit (haul distance <1 km)	Y	2970.8	m3	$3.90		$11,579	< =1km Backfill and rehabilitate dams assumed 2m depth*area Greywater treatment pond (254.6m2) Sludge dam (228.8m2) Disused pond (171.9m2) Maturatation pond (422.9m2) Blackwater treatment pond (213.1m2) Stormwater dam (194.1m2)	D10 push over soft material at $270/hr 657 Scrapers cut to spoil at $430/hr, 150BCM/hr/machine, Ancillary watercart and grader at $0.75c/m3
	Shotcrete application on cuttings and steep slopes	Y		m2	$185.00		$0		This rate is used to rehabilitate steep slopes of weathered rock, roadway cuttings, etc that cannot be cut back and stabilised.
	Trim, rock rake & deep rip (includes levelling / landscaping and rip in 1 direction)	Y	3.0	ha	$960.00		$2,852	Assume this is required for all dams, infrastructure areas, and roads including magazine.	16H Grader @ $212 per hour - ripping in 1 direction only.
	Deep rip hard stand / lay down areas	Y		ha	$960.00		$0		D10 dozer @ $332 per hour - deep rip in 2 directions @ 5 m spacing ~3 hr per hectare.
	Structural works, banks, waterways - contour banks, drainage channels and other soil conservation measures	Y	3.0	ha	$1,600		$4,753	Assume this is required for all dams, infrastructure areas, and roads including magazine.	Combination of dozer and excavator work. Small dozer (D6 or similar) @ ~$200 per hour plus grader @ $212 per hour for ~4 hours each per ha.
	Construction of spine drains / drop structures and/or stabilising water course entry points - required for large catchments	Y		m2	$35.00		$0		Installation of on-site rock material (rip-rap) where managing water run-off from disturbed land and/or upon entry to water courses - prevents erosion of gully head (assumes competent material is locally available).
						Earthworks / Structural Works (Landform Establishment) Subtotal	$19,184		
Land Preparation and Revegetation (Growth Media Development and Ecosystem Establishment)	Source, cart and spread growth media - haul distance >1 km but <2 km	Y	4456.0	m3	$3.91		$17,411	> 1km but < = 2km Assume topsoil is available nearby for rehabilitation.	550 m3/hr with 4 x 657 scrapers at $430/hr, D10 trimming at $270/hr 3ha/day at 150mm depth
	Planting mature trees (>15 cm)	Y		allow	$20.00		$0		4 m centres.
	Planting tube stock (<15 cm)	Y		allow	$10.00		$0		4 m centres.
	Direct seeding / fertiliser (pasture grass species)	Y		ha	$1,240		$0		Rate can fluctuate however this is a suitable standard rate.
	Direct seeding / fertiliser (tree or native grass species)	Y	2.97	ha	$2,095		$6,224	Rehabilitation and reseeding of distrubed areas at Shaft 4 to native vegetation	Rate can fluctuate however this is a suitable standard rate.
	Hydro-seeding with straw mulching and bitumen tack	Y		m2	$1.80		$0		Rate can fluctuate however this is a suitable standard rate.
	Single application of fertiliser (pasture)	Y		ha	$420.00		$0		Assumes 250 kg / ha. These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
	Single application of fertiliser (trees)	Y		ha	$140.00		$0		These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
	Spoil amelioration (adding lime / gypsum etc.)	Y		ha	$860.00		$0		Assumes 2.5 t / ha as an average application rate.
	growth media amelioration with biosolids	Y		ha	$1,015		$0		Recent experience with agronomy projects.
	Construct no-climb stock fence around rehabilitated areas	Y		m	$9.50		$0		Standard rate for no-climb stock fencing.
	Construct standard stock fence around rehabilitated areas	Y		m	$4.00		$0		Standard rate for standard stock fencing.
	Purchase and erect warning signs	Y		allow	$250.00		$0		Compliance with AS 1319-1994 - Safety signs for the occupational environment - installed every 25 m.
	Supply from external sources virgin excavated natural material (VENM) for growth media.	Y		m3	$80.80		$0		D7 to spread material at $205/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $70/m3 for imported fill material
	Supply from external sources a combination of virgin excavated natural material (VENM) and spoil from large excavation for filing voids and/or capping etc.	Y		m3	$72.50		$0		D10 push into void at $270/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $60/m3 for imported fill material
						Land Preparation and Revegetation (Growth Media Development and Ecosystem Establishment) Subtotal	$23,635		
Water Management	Clean water dams to be retained after decommissioning – make safe and minor earthworks	Y	1	allow	$2,500		$2,500	Assumed the collection dam will be retained at closure for fire management and SCA use	Provisional sum for earthworks and revegetation required to rehabilitate dam batters etc suitable for re-use by an alternate land-user - D6 Dozer (or similar) @ ~$200 per hour and pasture grass.
	Remove sediments from the floor of the dam to enable it to be converted into clean water structure (haul distance <1km)	Y	1413.1	m3	$3.55		$5,017	< =1km Remove sediments from collection dam for use as clean water dam. 0.5m sediment, 2826.2m2	80t excavator and 90c/m3 haul with artic trucks, 220m3/hr, two trucks required for short distance + 75c ancillary - excludes any stockpile treatment: no dozer (add 90c/m3 if required).

	Removal of evaporation fans and/or other water transfer and management infrastructure	Y	1	allow	$25,000		$25,000	Nominal allowance for removal of water management infrastructure. Dams to be backfilled at closure and covered above under bulk push	Provisional sum for removal of water management infrastructure.
						Water Management Subtotal	$32,517		
Maintenance of Rehabilitated Areas	Maintenance of areas that have been shaped and seeded and revegetation has been 'successful'	Y	2.97	ha	$900.00		$2,674	Maintenance of rehabilitated area at shaft 4	Rehabilitation maintenance might include re-seeding, watering, fertilising, minor re-shaping, erosion control, inspections/audits - does not include major repair
	Existing rehabilitation repair - minor	Y	1.5	ha	$1,200		$1,782	assumed 10% of rehabilitated area will require minor repair	Areas requiring minor repair - rills, minor growth media replacement.
	Existing rehabilitation repair - moderate	Y		ha	$1,700		$0		Areas requiring moderate repair - rills, significant growth media replacement.
	Existing rehabilitation repair - major	Y		ha	$2,500		$0		Areas requiring major repair - rills, gullies, growth media replacement, some level of additional surface water management
	Existing rehabilitation repair - total failure of landform	Y		ha	$40,000		$0		Areas that require extensive rehabilitation repair - re-design and re-construction of landform.
						Maintenance of Rehabilitated Areas Subtotal	$4,456		
Additional Items	Other 1 <insert>	N			This is				This item includes <<to be added by the operator>>
	Other 2 <insert>	N			deliberately				This item includes <<to be added by the operator>>
	Other 3 <insert>	N			left blank				This item includes <<to be added by the operator>>
						Additional Items Subtotal	$0		
Total Cost for Infrastructure Domain							**$1,471,219**		

Underground Operations

Domain 2b: Tailings & Rejects

Total Cost for Tailings & Rejects Domain **$0**

Additional Assumptions: *Record any relevant assumptions to this domain below:*

	Key Rehabilitation Area Data for Domain	**Enter data below manually**
	Total Landform Establishment:	
	Total Growth Media Development:	
	Total Ecosystem Establishment:	

Management Precinct	Activity / Description	Applicable (Y or N)	Quantity	Unit	Default Unit Rate	Alternative Unit Rate	Total Cost	Basis for Costs Estimation and Additional Relevant Information	Description / Notes:
Contaminated Materials	Undertake a preliminary site investigation (Phase 1). This accounts for current and historical locations where areas of disturbance are clustered. If there are multiple cluster areas on site, multiple studies may be required.	Y		Cluster	$15,000		$0		The preliminary investigation would include at minimum a desktop assessment of the area and site history, incidents, etc. as per the National Environmental Protection (Site Contamination) Measure (NEPM) Phase 1 assessment (EP Act Section 389 (2) (iv)) or similar approved and recognised assessment method. A cluster may include: - Mine infrastructure (i.e., fuel / chemical store, workshop, vehicle wash-down, sewage treatment etc.) - Processing plants (i.e., ore and product storage, mine waste storage and disposal, rail load-out etc.) - Remote pit-top facilities (i.e., vehicle re-fuel, sewage treatment, secondary workshop, chemical
	Undertake an intrusive site investigation. This accounts for current and historical locations where areas of disturbance are clustered. If there are multiple cluster areas on site, multiple intrusive investigations should be included.	Y		Cluster	$100,000		$0		The intrusive investigation would include at minimum a site walkover and field sampling as per the National Environmental Protection (Site Contamination) Measure (NEPM) Phase 2 intrusive investigation (EP Act Section 389 (2) (iv)) or similar approved and recognised assessment method. Note: An intrusive investigation is not required for all contaminated areas and should be applied considering the rehabilitation program, site history, location, etc. A cluster area where it is highly anticipated that contamination has occurred (i.e. underground tanks / pipes that are known to have leaked, chemical stores with earthen bunds, around ineffective oil/water separators etc.) and further field work is required.
	Removal and disposal of contaminated water from tanks, bunded areas and sumps	Y		L	$0.35		$0		Cost for recent sump clean-up from resource activity - requires specialists to treat.
	Remove material (carbonaceous / metalliferous spillage or otherwise) from footprint of the process facility (leach pads) / stockpile area (ROM product) / roads and dump in a void on-site (Select Haul Distance from list)	Y		m3	Select from List			Select Haul Distance Here	This item includes scraping and removal of the volume of carbonaceous material using dozer, grader etc. to make safe an area and enable the establishment of rehabilitation.
	Load, cart and dispose of High Level contaminated material off site to a licensed landfill. Assumes cartage to a licensed landfill	Y		m3	$700.00		$0		Includes load, haul and dump fees to a licensed facility.
	Load, cart and disposal of Low Level contaminated material off site to a licensed landfill. Add $50/m3 for cartage to regional landfill	Y		m3	$200.00		$0		Includes load, haul and dump fees to a licensed facility.
	Onsite remediation of hydrocarbon contaminated soils manual land farming (Select Volume from List)	Y		m3	Select from List			Select Volume Here	Spreading of contaminated soils on a prepared surface and stimulation of aerobic microbial activity within the soils through aeration and/or the addition of minerals, nutrients and moisture to promote the aerobic degradation of organic chemicals - time frame of up to 24 months.
	Mobilisation of cement stabilisation plant and equipment for hydrocarbon (i.e., PAH, long chain hydrocarbons, etc.) contaminated soil treatment	Y		Item	$150,000		$0		Required if treatment of hydrocarbon contamination is required to be fast tracked.
	On-site remediation of hydrocarbon contaminated soils - using a mobile treatment unit	Y		m3	$165.00		$0		Additional cost as the treatment process is fast tracked.
	Remove and dispose of asbestos (<750 m2)	Y		m2	$50.00		$0		Where an assessment/estimation has been made to confirm the volume of asbestos to be removed.
	Remove and dispose of asbestos (>750 m2)	Y		m2	$40.00		$0		Where an assessment/estimation has been made to confirm the volume of asbestos to be removed.
	Remove and dispose of asbestos	Y		tonne	$2,400		$0		6 mm asbestos sheet approx. 15 kg / m2 = ~70 m2 per ton. Allowing $20 / m2 for removal, 4 hours trucking @$125 and $100 / t disposal plus 20% OHP = $2,400 / t
	Treatment of known Acid Sulfate Soils	Y		ha	$2,580		$0		Assumes ASS is treatable via neutralisation and does not require capping and isolation.
	Removal and disposal of plastic liner (i.e. dam, leach pad, sump etc.)	Y		m2	$1.00		$0		Provisional sum for cutting using ripping tynes and on-site disposal of the liner.
						Contaminated Materials Subtotal	$0		
Roads and Tracks	Unsealed roads / vehicle park-up areas – minor works including deep rip and trim	Y		ha	$960.00		$0		Assumes ~6 m road width - 16H Grader @ $212 per hour.
	Unsealed roads / access tracks / vehicle park-up areas with windrows and/or small earthen bunds – minor earthworks and deep rip and trim	Y		ha	$1,500		$0		Assumes ~20 m road width - D10 Dozer @ $332 per hour.
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip and seed (pasture grass)	Y		ha	$3,698		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	Y		ha	$4,485		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.
	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (pasture grass)	Y		ha	$3,820		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.

	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	Y		ha	$4,595		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.
	Remove stabilised material (blue metal, aggregate etc.) from roadways and disposal on-site/locally (Select Haul Distance from list)	Y		m3	Select from List			Select Haul Distance Here	This item includes the scraping and removal of the volume of stabilised material from the road, laydown or other surface using an excavator, dozer and grader to enable the establishment of rehabilitation.
						Roads and Tracks Subtotal	$0		
Earthworks / Structural Works (Landform Establishment)	Major bulk pushing to achieve grades nominated in the approval/permit – Select Push Length	Y		m3	Select from List			Select Push Length Here	Major bulk pushing to achieve grades nominated in the approval/permit
	Minor reshaping and pushing	Y		ha	$3,900		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation).
	Fill dams, voids etc. - Source local material, cart and spread to cap or backfill, cap thickness determined by approval / permit (Select Haul Distance from List)	Y		m3	Select from List			Select Haul Distance Here	This item includes the volume of material requiring backfill using an excavator and scraper to fill the void and enable the establishment of rehabilitation.
	Trim, rock rake & deep rip (includes levelling / landscaping and rip in 1 direction)	Y		ha	$960.00		$0		16H Grader @ $212 per hour - ripping in 1 direction only.
	Structural works, banks, waterways - contour banks, drainage channels and other soil conservation measures	Y		ha	$1,600		$0		Combination of dozer and excavator work. Small dozer (D6 or similar) @ ~$200 per hour plus grader @ $212 per hour for ~4 hours each per ha.
	Construction of spine drains / drop structures and/or stabilising water course entry points - required for large catchments	Y		m2	$35.00		$0		Installation of on-site rock material (rip-rap) where managing water run-off from disturbed land and/or upon entry to water courses - prevents erosion of gully head (assumes competent material is locally available)

							Earthworks / Structural Works (Landform Establishment) Subtotal	**$0**	
Mine Waste	Reshaping, capping / sealing of a structure unlikely to present difficulties due to chemistry – reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), and physical properties (i.e., shear strength, etc.) - where the mine waste stream is geochemically benign and / or the strength condition within the upper 4 - 6 m meets the target shear strength profile.	**Y**		ha	**$81,000**		**$0**		This includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume material with the appropriate chemical and physical properties. This rate assumes suitable capping material is available on site within 10 km, and an average cap thickness of approximately 1 m including growth media. Water quality from runoff, seepage etc. meets site-specific environment water quality
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	**Y**		allow	**Use alternate rate cell**		**$0**		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	**Y**		allow	**Use alternate rate cell**		**$0**		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Reshaping, capping / sealing of structure likely to present moderate difficulties due to chemistry – reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), or physical properties – shear strength, etc. limiting equipment choice.	**Y**		ha	**$108,000**		**$0**		This item includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume of material to cap / cover facilities where the tailings or rejects base is at a strength that enables economically efficient construction methods with small plant. This rate assumes suitable capping material is available on site within 10 km, and an average cap thickness of approximately 2 m including growth media. This may require additional materials (such as capillary breaks, geofabric, etc.), specific material types (e.g. acid neutralising / consuming materials, competent rock etc.) , and associated activities (i.e., load / haul / place / crush / screen / borrow etc.). Costs for haulage of specialised materials must be added separately if required.
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	**Y**		allow	**Use alternate rate cell**		**$0**		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	**Y**		allow	**Use alternate rate cell**		**$0**		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Reshaping, capping / sealing of structure likely to present considerable difficulties due to reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), and / or physical properties (low shear strength greatly limiting equipment selection for material placement etc.)	**Y**		ha	**$170,000**		**$0**		This item includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume of material to cap / cover facilities of high geochemical risk, and / or low shear strength that prohibits economically efficient construction methods. This rate assumes suitable capping material/s are available on site within 10 km, and an average cap thickness of approximately 2.5 m including growth media. This may require additional materials (i.e., capillary breaks, geofabric, etc.), specific material types (e.g. acid neutralising / consuming materials, competent rock etc.), and associated activities (i.e., load / haul / place / crush / screen / borrow etc.). Costs for haulage of specialised materials must be added separately if required.
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	**Y**		allow	**Use alternate rate cell**		**$0**		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	**Y**		allow	**Use alternate rate cell**		**$0**		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
							Mine Waste Subtotal	**$0**	
Land Preparation and Revegetation (Growth Media Development and Ecosystem Establishment)	Source, cart and spread growth media (Select Haul Distance from List)	**Y**		m3	**Select from List**			**Select Haul Distance Here**	If topsoil is not available on-site, then Virgin Excavated Natural Material (VENM) may need to be externally sourced.
	Direct seeding / fertiliser (pasture grass species)	**Y**		ha	**$1,240**		**$0**		Rate can fluctuate however this is a suitable standard rate.
	Direct seeding / fertiliser (tree or native grass species)	**Y**		ha	**$2,095**		**$0**		Rate can fluctuate however this is a suitable standard rate.
	Hydro-seeding with straw mulching and bitumen tack	**Y**		m2	**$1.80**		**$0**		Rate can fluctuate however this is a suitable standard rate.
	Single application of fertiliser (pasture)	**Y**		ha	**$420.00**		**$0**		Assumes 250 kg / ha. These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
	Single application of fertiliser (trees)	**Y**		ha	**$140.00**		**$0**		These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
	Spoil amelioration (adding lime / gypsum etc.)	**Y**		ha	**$860.00**		**$0**		Assumes 2.5 t / ha as an average application rate.
	growth media amelioration with biosolids	**Y**		ha	**$1,015**		**$0**		Recent experience with agronomy projects.
	Construct no-climb stock fence around rehabilitated areas	**Y**		m	**$9.50**		**$0**		Standard rate for no-climb stock fencing.
	Construct standard stock fence around rehabilitated areas	**Y**		m	**$4.00**		**$0**		Standard rate for standard stock fencing.
	Purchase and erect warning signs	**Y**		allow	**$250.00**		**$0**		Compliance with AS 1319-1994 - Safety signs for the occupational environment - installed every 25 m.

	Supply from external sources virgin excavated natural material (VENM) for growth media.	Y		m3	$80.80		$0		D7 to spread material at $205/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $70/m3 for imported fill material
	Supply from external sources a combination of virgin excavated natural material (VENM) and spoil from large excavation for filing voids and/or capping etc.	Y		m3	$72.50		$0		D10 push into void at $270/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $60/m3 for imported fill material
Land Preparation and Revegetation (Growth Media Development and Ecosystem Establishment) Subtotal							$0		
Water Management	Clean water dams to be retained after decommissioning – make safe and minor earthworks	Y		allow	$2,500		$0		Provisional sum for earthworks and revegetation required to rehabilitate dam batters etc suitable for re-use by an alternate land-user - D6 Dozer (or similar) @ ~$200 per hour and pasture grass
	Remove sediments from the floor of the dam to enable it to be converted into clean water structure (Select Haul Distance from list)	Y		m3	Select from List			Select Haul Distance Here	This item includes the volume of contaminated sediment requiring removal using an excavator, truck and dozer to clean out the dam.
Water Management Subtotal							$0		
Maintenance of Rehabilitated Areas	Maintenance of areas that have been shaped and seeded and revegetation has been 'successful'	Y		ha	$900		$0		Rehabilitation maintenance might include re-seeding, watering, fertilising, minor re-shaping, erosion control, inspections/audits - does not include major repair
	Existing rehabilitation repair - minor	Y		ha	$1,200		$0		Areas requiring minor repair - rills, minor growth media replacement.
	Existing rehabilitation repair - moderate	Y		ha	$1,700		$0		Areas requiring moderate repair - rills, significant growth media replacement.
	Existing rehabilitation repair - major	Y		ha	$2,500		$0		Areas requiring major repair - rills, gullies, growth media replacement, some level of additional surface water management.
	Existing rehabilitation repair - total failure of landform	Y		ha	$40,000		$0		Areas that require extensive rehabilitation repair - re-design and re-construction of landform.
Maintenance of Rehabilitated Areas Subtotal							$0		
Additional Items	Other 1 <insert>	N			This is				This item includes **<<to be added by the operator>>**
	Other 2 <insert>	N			deliberately				This item includes **<<to be added by the operator>>**
	Other 3 <insert>	N			left blank				This item includes **<<to be added by the operator>>**
Additional Items Subtotal							$0		
Total Cost for Tailings & Rejects Domain							**$0**		

Underground Operations

Domain 3b: Overburden & Waste

Total Cost for Overburden & Waste Domain **$0**

Additional Assumptions: *Record any relevant assumptions to this domain below:*

	Key Rehabilitation Area Data for Domain	**Enter data below manually**
	Total Landform Establishment:	
	Total Growth Media Development:	
	Total Ecosystem Establishment:	

Management Precinct	Activity / Description	Applicable (Y or N)	Quantity	Unit	Default Unit Rate	Alternative Unit Rate	Total Cost	Basis for Costs Estimation and Additional Relevant Information	Description / Notes:
Contaminated Materials	Treatment of known Acid Sulfate Soils	Y		ha	$2,580		$0		Assumes ASS is treatable via neutralisation and does not require capping and isolation.
	Removal and disposal of plastic liner (i.e. dam, leach pad, sump etc.)	Y		m2	$1.00		$0		Provisional sum for cutting using ripping tynes and on-site disposal of the liner.
						Contaminated Materials Subtotal	$0		
Roads and Tracks	Unsealed roads / vehicle park-up areas – minor works including deep rip and trim	Y		ha	$960.00		$0		Assumes ~6 m road width - 16H Grader @ $212 per hour.
	Unsealed roads / access tracks / vehicle park-up areas with windrows and/or small earthen bunds – minor earthworks and deep rip and trim	Y		ha	$1,500		$0		Assumes ~20 m road width - D10 Dozer @ $332 per hour.
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip and seed (pasture grass)	Y		ha	$3,698		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	Y		ha	$4,485		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.
	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (pasture grass)	Y		ha	$3,820		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.
	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	Y		ha	$4,595		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.
	Remove stabilised material (blue metal, aggregate etc.) from roadways and disposal on-site/locally (Select Haul Distance from list)	Y		m3	Select from List			Select Haul Distance Here	This item includes the scraping and removal of the volume of stabilised material from the road, laydown or other surface using an excavator, dozer and grader to enable the establishment of rehabilitation.
						Roads and Tracks Subtotal	$0		
Earthworks / Structural Works (Landform Establishment)	Major bulk pushing to achieve grades nominated in the approval/permit – Select Push Length	Y		m3	Select from List			Select Push Length Here	Major bulk pushing to achieve grades nominated in the approval/permit
	Minor reshaping and pushing	Y		ha	$3,900		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation).
	Fill dams, voids etc. - Source local material, cart and spread to cap or backfill, cap thickness determined by approval / permit (Select Haul Distance from List)	Y		m3	Select from List			Select Haul Distance Here	This item includes the volume of material requiring backfill using an excavator and scraper to fill the void and enable the establishment of rehabilitation.
	Shotcrete application on cuttings and steep slopes	Y		m2	$185.00		$0		This rate is used to rehabilitate steep slopes of weathered rock, roadway cuttings, etc that cannot be cut back and stabilised.
	Trim, rock rake & deep rip (includes levelling / landscaping and rip in 1 direction)	Y		ha	$960.00		$0		16H Grader @ $212 per hour - ripping in 1 direction only.
	Structural works, banks, waterways - contour banks, drainage channels and other soil conservation measures	Y		ha	$1,600		$0		Combination of dozer and excavator work. Small dozer (D6 or similar) @ ~$200 per hour plus grader @ $212 per hour for ~4 hours each per ha.
	Construction of spine drains / drop structures and/or stabilising water course entry points - required for large catchments	Y		m2	$35.00		$0		Installation of on-site rock material (rip-rap) where managing water run-off from disturbed land and/or upon entry to water courses - prevents erosion of gully head (assumes competent material is locally available).
						Earthworks / Structural Works (Landform Establishment) Subtotal	$0		
Mine Waste	Reshaping, capping / sealing of a structure unlikely to present difficulties due to chemistry – reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), and physical properties (i.e., shear strength, etc.) - where the mine waste stream is geochemically benign and / or the strength condition within the upper 4 - 6 m meets the target shear strength profile.	Y		ha	$81,000		$0		This includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume material with the appropriate chemical and physical properties. This rate assumes suitable capping material is available on site within 10 km, and an average cap thickness of approximately 1 m including growth media. Water quality from runoff, seepage etc. meets site-specific environment water quality values.
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.).
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.).

	Reshaping, capping / sealing of structure likely to present moderate difficulties due to chemistry – reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), or physical properties – shear strength, etc. limiting equipment choice.	Y		ha	$108,000		$0		This item includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume of material to cap / cover facilities where the tailings or rejects base is at a strength that enables economically efficient construction methods with small plant. This rate assumes suitable capping material is available on site within 10 km, and an average cap thickness of approximately 2 m including growth media. This may require additional materials (such as capillary breaks, geofabric, etc.), specific material types (e.g. acid neutralising / consuming materials, competent rock etc.) , and associated activities (i.e., load / haul / place / crush / screen / borrow etc.). Costs for haulage of specialised materials must be added separately if required.
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Reshaping, capping / sealing of structure likely to present considerable difficulties due to reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), and / or physical properties (low shear strength greatly limiting equipment selection for material placement etc.)	Y		ha	$170,000		$0		This item includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume of material to cap / cover facilities of high geochemical risk, and / or low shear strength that prohibits economically efficient construction methods. This rate assumes suitable capping material/s are available on site within 10 km, and an average cap thickness of approximately 2.5 m including growth media. This may require additional materials (i.e., capillary breaks, geofabric, etc.), specific material types (e.g. acid neutralising / consuming materials, competent rock etc.), and associated activities (i.e., load / haul / place / crush / screen / borrow etc.). Costs for haulage of specialised materials must be added separately if required.
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
						Mine Waste Subtotal	$0		
Land Preparation and Revegetation (Growth Media Development and Ecosystem Establishment)	Source, cart and spread growth media (Select Haul Distance from List)	Y		m3	Select from List			Select Haul Distance Here	If topsoil is not available on-site, then Virgin Excavated Natural Material (VENM) may need to be externally sourced.
	Planting mature trees (>15 cm)	Y		allow	$20.00		$0		4 m centres.
	Planting tube stock (<15 cm)	Y		allow	$10.00		$0		4 m centres.
	Direct seeding / fertiliser (pasture grass species)	Y		ha	$1,240		$0		Rate can fluctuate however this is a suitable standard rate.
	Direct seeding / fertiliser (tree or native grass species)	Y		ha	$2,095		$0		Rate can fluctuate however this is a suitable standard rate.
	Hydro-seeding with straw mulching and bitumen tack	Y		m2	$1.80		$0		Rate can fluctuate however this is a suitable standard rate.
	Single application of fertiliser (pasture)	Y		ha	$420.00		$0		Assumes 250 kg / ha. These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
	Single application of fertiliser (trees)	Y		ha	$140.00		$0		These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
	Spoil amelioration (adding lime / gypsum etc.)	Y		ha	$860.00		$0		Assumes 2.5 t / ha as an average application rate.
	growth media amelioration with biosolids	Y		ha	$1,015		$0		Recent experience with agronomy projects.
	Construct no-climb stock fence around rehabilitated areas	Y		m	$9.50		$0		Standard rate for no-climb stock fencing.
	Construct standard stock fence around rehabilitated areas	Y		m	$4.00		$0		Standard rate for standard stock fencing.
	Purchase and erect warning signs	Y		allow	$250.00		$0		Compliance with AS 1319-1994 - Safety signs for the occupational environment - installed every 25 m.
	Supply from external sources virgin excavated natural material (VENM) for growth media.	Y		m3	$80.80		$0		D7 to spread material at $205/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $70/m3 for imported fill material
	Supply from external sources a combination of virgin excavated natural material (VENM) and spoil from large excavation for filing voids and/or capping etc.	Y		m3	$72.50		$0		D10 push into void at $270/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $60/m3 for imported fill material
						Land Preparation and Revegetation (Growth Media Development and Ecosystem Establishment) Subtotal	$0		
Water Management	Clean water dams to be retained after decommissioning – make safe and minor earthworks	Y		allow	$2,500		$0		Provisional sum for earthworks and revegetation required to rehabilitate dam batters etc suitable for re-use by an alternate land-user - D6 Dozer (or similar) @ ~$200 per hour and pasture grass
	Remove sediments from the floor of the dam to enable it to be converted into clean water structure (Select Haul Distance from list)	Y		m3	Select from List			Select Haul Distance Here	This item includes the volume of contaminated sediment requiring removal using an excavator, truck and dozer to clean out the dam.
						Water Management Subtotal	$0		

Maintenance of Rehabilitated Areas	Maintenance of areas that have been shaped and seeded and revegetation has been 'successful'	**Y**		ha	**$900.00**		**$0**		Rehabilitation maintenance might include re-seeding, watering, fertilising, minor re-shaping, erosion control, inspections/audits - does not include major repair
	Existing rehabilitation repair - minor	**Y**		ha	**$1,200**		**$0**		Areas requiring minor repair - rills, minor growth media replacement.
	Existing rehabilitation repair - moderate	**Y**		ha	**$1,700**		**$0**		Areas requiring moderate repair - rills, significant growth media replacement.
	Existing rehabilitation repair - major	**Y**		ha	**$2,500**		**$0**		Areas requiring major repair - rills, gullies, growth media replacement, some level of additional surface water management.
	Existing rehabilitation repair - total failure of landform	**Y**		ha	**$40,000**		**$0**		Areas that require extensive rehabilitation repair - re-design and re-construction of landform.
Maintenance of Rehabilitated Areas Subtotal							**$0**		
Additional Items	Other 1 <insert>	**N**			**This is**				This item includes **<<to be added by the operator>>**
	Other 2 <insert>	**N**			**deliberately**				This item includes **<<to be added by the operator>>**
	Other 3 <insert>	**N**			**left blank**				This item includes **<<to be added by the operator>>**
Additional Items Subtotal							**$0**		
Total Cost for Overburden & Waste Domain							**$0**		

Underground Operations

Domain 4b: Subsidence and Management

Total Cost for Subsidence and Management Activities **$26,068**

Additional Assumptions: *Record any relevant assumptions to this domain below:*

General management items for Shaft 4 pit top not already covered in the Russell Vale Pit Top and REA tab	**Key Rehabilitation Area Data for Domain**	**Enter data below manually**
	Total Landform Establishment:	
	Total Growth Media Development:	
	Total Ecosystem Establishment:	

Management Precinct	Activity / Description	Applicable (Y or N)	Quantity	Unit	Default Unit Rate	Alternative Unit Rate	Total Cost	Basis for Costs Estimation and Additional Relevant Information	Description / Notes:
Subsidence Repairs	Minor stabilisation works and maintenance of mine subsidence areas - ripping etc.	Y		ha	$1,500		$0		D8 Dozer @ $240 per hour and/or grader @ $160 per hour.
	Crack filling to repair subsidence impacts	Y		m	$1,485		$0		Undertake more substantial works to backfill cracks and/or sink holes (e.g., filling with mulch prior to grouting, grouting, etc.)
	Water course restoration to repair subsidence impacts	Y		allow	Use alternate rate cell		$0		Undertake more substantial works to remediate water courses (e.g., channel bed repairs, rock bar repairs, swamp stabilisation etc.)
	Create cut-through to re-establish natural water courses/drainage channels following subsidence	Y		allow	$3,000		$0		Includes all earthworks and revegetation required to re-establish the natural drainage profile of the subsided area.
						Subsidence Repairs Subtotal	$0		
Vents, Shafts and Boreholes	Maintenance and monitoring of sealed adits/portals and shafts (for a total of 5 years)	Y	1	allow	$25,000		$25,000	Maintenance and monitoring of the sealed No 4 shaft	Estimate to undertake periodic inspections by a qualified person and provide a completions report for DRG sign-off.
						Vents, Shafts and Boreholes Subtotal	$25,000		
Water Management	On-site treatment of contaminated water due to high salt (includes removal of metals etc, brine disposal and cost of mobile water treatment unit)	Y		ML	$3,600		$0		Rate can fluctuate depending on treatment type however this is a suitable standard rate for current programs at mining operations.
	On-site treatment of contaminated water due to low pH (incudes removal of metals etc, neutralisation treatments and cost of mobile water treatment unit	Y		ML	$1,500		$0		Rate can fluctuate depending on treatment type however this is a suitable standard rate for current programs at mining operations.
						Water Management Subtotal	$0		
Creek Diversions	Repairs and/or stabilisation of new or compromised water course diversion	Y		m	$2,500		$0		Assumes material is suitable for revegetating and has a reasonable chance of stabilising.
	Long term maintenance of water course diversion – Channel constructed through backfilled material	Y		m	$1,500		$0		Assumes maintenance has been kept up and significant works are not required.
	Long term maintenance of water course diversion – Channel constructed through competent material	Y		m	$750.00		$0		Assumes maintenance has been kept up and significant works are not required.
	Installation of rock armouring	Y		m2	$6.00		$0		Assumes competent material is locally available - multiply costs by 2 for sourcing and transporting from offsite location.
						Creek Diversions Subtotal	$0		
Land Management	Pest management on buffer lands, non-disturbed, and rehabilitated areas	Y		ha	$150.00		$0		Feral animal baiting programs if required and waste materials required to be removed.
	Land management of undisturbed areas (rehabilitation, weeds, ferals, erosion and sediment control works)	Y	2.67	ha	$400.00		$1,068	Management of undisturbed areas within the shaft 4 area	Undisturbed areas within the lease boundary that require land management activities.
						Land Management Subtotal	$1,068		
Heritage Items	The restoration and care and maintenance of items that have heritage significance	Y		allow	Use alternate rate cell		$0		Item for the redistribution of Aboriginal artefacts, preservation of European heritage items or a combination of activities.
						Heritage Items Subtotal	$0		
Sundry Items	Development of an 'Unplanned' Project Closure Plan - for either State Significant or Non State Significant Developments	Y		allow	Select from List			Select Category Here	Provisional sum to be used to refine the conceptual closure plan into a detailed closure plan with execution strategies for rehabilitation activities.
	DRG tender preparation and assessment, stakeholder consultation, risk assessment facilitation and management, statutory reporting and instruments, permitting and compliance requirements, document and data management	Y		allow	Use alternate rate cell		$0		Provisional sum for the NSW Government to prepare tender documentation (i.e. demolition, waste disposal, earthworks, environmental management etc.) manage stakeholders and establish permitting and compliance requirements for closure.
	Site security during closure	Y		yr.	$75,000		$0		Provisional sum for site security measures required during closure. This includes nightly patrols and first response in the event of an out of hours incident.
	HAZMAT Clean-up - cleaning and decontaminating plant and equipment, chemical storage locations, oil and grease traps, tanks, vessels, and pipe work etc	Y		allow	$100,000		$0		Provisional sum to perform the site clean-up and ensuring the demolition program is not interrupted due to potential contamination of waste streams.
	Removal and disposal of radiation devices	Y		each	$25,000		$0		Provisional sum for removal and disposal of monitoring devices on conveyors using a radiation source (i.e., Americium – 241, Plutonium – 238, Caesium - 137 etc)
	Additional fees for accessing State, Crown or other public lands for rehabilitation/remediation activities	Y		allow	Use alternate rate cell		$0		Provisional sum.
						Sundry Items Subtotal	$0		
Mobilisation and Demobilisation	Mobilisation & Demobilisation for small mine or quarry	Y		Item	$40,000		$0		May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
	Mobilisation & Demobilisation (Distance to site <150 km)	Y		item	$100,000		$0		May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
	Mobilisation & Demobilisation (Distance to site >150 km but <500 km)	Y		item	$150,000		$0		May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
	Mobilisation & Demobilisation (Distance to site >500 km but <1000 km)	Y		item	$300,000		$0		May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
	Mobilisation & Demobilisation (Distance to site >1000 km)	Y		item	$500,000		$0		May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
						Mobilisation and Demobilisation Subtotal	$0		

Additional Items	Other 1 <insert>	**N**			**This is**				This item includes **<<to be added by the operator>>**
	Other 2 <insert>	**N**			**deliberately**				This item includes **<<to be added by the operator>>**
	Other 3 <insert>	**N**			**left blank**				This item includes **<<to be added by the operator>>**
						Additional Items Subtotal	**$0**		
Total Cost for Subsidence and Management Activities							**$26,068**		

Underground Operations

Domain 1c: Infrastructure

Total Cost for Infrastructure Domain **$1,029,954**

Additional Assumptions: *Record any relevant assumptions to this domain below:*

Infrastructure areas at shafts 1, 2, 3 and 5 to be demolished and rehabilitated	**Key Rehabilitation Area Data for Domain**	**Enter data below manually**
It is assumed that minor topsoil volumes will be obtained locally	**Total Landform Establishment:**	
All Russell Vale Colliery boreholes and piezometers have been included in this domain.	**Total Growth Media Development:**	
Power has already been teminated to shafts 1 and 3	**Total Ecosystem Establishment:**	

Management Precinct	Activity / Description	Applicable (Y or N)	Quantity	Unit	Default Unit Rate	Alternative Unit Rate	Total Cost	Basis for Costs Estimation and Additional Relevant Information	Description / Notes:
Termination of Services and Demolition Works	Disconnect and terminate all services (Water, electricity, gas etc at point of attachment to site)	Y		allow	$35,000		$0		For disconnection of all services, at building boundaries, physical cut at the point of attachment or distribution location. If infrastructure is not consolidated (i.e., administration, camp and workshops are in separate places), consider multiple disconnection fees
	Disconnect and terminate services at remote areas (i.e. pump stations, remote workshops, sewage treatment plant etc.)	Y	2	allow	$5,500		$11,000	**Disconnection of No 3 and 5 shaft sites.** **No 1 and 3 Shafts already disconnected and terminated.**	Used for infrastructure remote from primary connection. Can also be used for small mines / quarries that do not have dedicated supplies from supply authorities such as steel lattice power lines
	Removal of low/medium voltage powerlines including disconnection, rolling up the wires and removing the poles - does not include the removal of	Y	12.1	km	$15,000		$181,500	**Length of power line easement from Pit top to shaft areas**	Applies to power lines on stobie, concrete or similar poles.
	Removal of power lines on tower or lattice structures (this includes disconnection, rolling up the wires and removing the structures) - does not include the removal of substations	Y		km	$100,000		$0		Applies to power lines on steel tower and steel lattice structures assuming 3 towers / km.
	Remove significant rail, road, water course overpass - manage potential interuptions and demolish and remove bridge supports/pylons/bridge structure etc. and dispose of waste material on-site/locally	Y		Item	$350,000		$0		Major structures constructed for the purposes of mining related works - does not include transport to regional disposal facility or equivalent
	Demolish and/or remove substations (assumes they are in a closed building). Dispose of waste material on-site/locally	Y		m2	$600.00		$0		Simple structure to demolish. Assumes single story building and segregation of contents for scrap as applicable
	Demolish and remove switchyard. Dispose of waste material on-site/locally	Y	260	m2	$55.00		$14,300	**Demolish and remove No 1 and 2 shaft switchyard**	Includes demolition and removal of all switchgear and transformers etc. and segregation of contents for scrap as applicable
	Demolish and remove demountable structures on concrete stumps. Assumes not being re-used	Y		m2	$40.00		$0		Crib huts, temporary offices and other 'non permanent' structures. Does not include transport to regional disposal facility or equivalent
	Demolish and remove small buildings/tanks (admin buildings, single story accommodation etc) and disposal on-site/locally	Y	390.6	m2	$65.00		$25,389	**Demolish and remove small buildings at no 1, and 2 shafts**	Simple structure to demolish, assumes no greater than 2 stories high. Does not include transport to regional disposal facility or equivalent
	Demolish and remove light industrial buildings and disposal on-site/locally	Y		m2/floor	$115.00		$0		Needs to be calculated per floor/level (Assume 1 floor/level = 3-4 m). Does not include transport to regional disposal facility or equivalent
	Demolish and remove industrial buildings (workshops tyre change and servicing area etc not CHPP/process plant) and disposal on-site/locally	Y		m2/floor	$180.00		$0		Needs to be calculated per floor/level (Assume 1 floor/level = 3-4 m). Does not include transport to regional disposal facility or equivalent
	Demolish and remove CHPP/process plant (include the area of each floor of the structure) and disposal on-site/locally	Y		m2/floor	$265.00		$0		Needs to be calculated per floor/level (Assume 1 floor/level = 3-4 m). Does not include transport to regional disposal facility or equivalent
	Collapse, demolish and remove washery, crushers, hoppers, mills, furnaces, agglomeration, electrowinning, floatation, sizing stations, rotary breakers, etc (include the area of each floor of the structure) and disposal on-site/locally	Y		m2/floor	$265.00		$0		Needs to be calculated per floor/level (Assume 1 floor/level = 3-4 m). Does not include transport to regional disposal facility or equivalent
	Collapse, demolish and remove stacker OR reclaimer (radial or luffing etc. with maneuverability for stockpile control) and disposal on-site/locally	Y		allow	$1,000,000		$0		Cost for removal of stacker or reclaim unit only. Does not include terminate services, remove rails and ballast etc. Does not include transport to regional disposal facility or equivalent
	Collapse, demolish and remove bucket wheel stacker/reclaimer and disposal on-site/locally	Y		allow	$2,500,000		$0		Cost for just removal of the bucket wheel stacker/reclaim units. Does not include terminate services, remove rails and ballast etc. Does not include transport to regional disposal facility or equivalent
	Remove stacker/reclaimer rails and ballast and demolish and remove concrete footings etc and disposal on-site/locally	Y		m	$75.00		$0		Includes both rails, does not include the conveyor system. Does not include transport to regional disposal facility or equivalent
	Collapse, Cut and Remove 5000T coal silo and disposal on-site/locally	Y		allow	$100,000		$0		Collapse structure and remove. Does not include transport to regional disposal facility or equivalent
	Collapse, Cut and Remove 3000 T coal silo and disposal on-site/locally	Y		allow	$85,000		$0		Collapse structure and remove. Does not include transport to regional disposal facility or equivalent
	Collapse, Cut and Remove 1250 T coal silo and disposal on-site/locally	Y		allow	$65,000		$0		Collapse structure and remove. Does not include transport to regional disposal facility or equivalent
	Collapse, Cut and Remove rail loading bins and disposal on-site/locally	Y		allow	$65,000		$0		Collapse structure and remove. Does not include transport to regional disposal facility or equivalent
	Demolish and remove onground conveyors, transfer stations & gantries (scrap only – does not include dismantling for reuse at another site) and disposal on-site/locally	Y		m	$210.00		$0		Estimate for on-ground conveyor including anything up to 10 m off the ground. Does not include transport to regional disposal facility or equivalent
	Demolish and remove elevated conveyors, transfer stations & gantries (scrap only, does not include dismantling for reuse at another site) and disposal on-site/locally	Y		m	$370.00		$0		Estimate for elevated conveyor up to ~10 m off the ground. Does not include transport to regional disposal facility or equivalent.
	Demolish and remove overhead conveyors, transfer stations & gantries (scrap only, does not include dismantling for reuse at another site) and disposal on-site/locally. This may include small scale fixed material stacking infrastructure	Y		m	$1,200		$0		Estimate for overhead conveyor including conveyors that are >10 m off the ground that require a crane to remove. Does not include transport to regional disposal facility or equivalent.
	Demolish reclaim tunnel, cut reo and expose reclaim conveyor, then collapse into the reclaim tunnel void (Does not include excavation to expose reclaim tunnel, removal of conveyor or backfilling void)	Y		m2	$80.00		$0		Does not include conveyor removal or backfill.

	Remove and demolish conveyor from reclaim tunnel (Does not include excavation and demolition of reclaim tunnel roof)	Y		m	$150.00		$0		Due to no canopy or infrastructure attached.
	Demolition of reclaim tunnel concrete (Assumes complete removal and dumping in mine pit void)	Y		m	$950.00		$0		Assumes this area will be used for another land-use that requires the structure to be dug up and re-buried somewhere else.
	Demolish and remove small tank clean (Thickener etc 3 - 9 m diameter) and disposal on-site/locally	Y	2	allow	$10,000		$20,000	Remove tank located near to No 1 shaft 6m diameter and No 5 shaft ~ 7m diameter	Assume tank is clean - contents removed. If tank is full allow extra 30% for excavator and 2 men to dig out and dispose. Does not include transport to regional disposal facility or equivalent.
	Demolish and remove medium tank clean (Thickener etc 10 - 15 m diameter) and disposal on-site/locally	Y		allow	$30,000		$0		Assume tank is clean - contents removed. If tank is full allow extra 30% for excavator and 2 men to dig out and dispose. Does not include transport to regional disposal facility or equivalent.
	Demolish and remove large tank clean (Thickener etc 15 - 30 m diameter) and disposal on-site/locally	Y		allow	$45,000		$0		Assume tank is clean - contents removed. If tank is full allow extra 30% for excavator and 2 men to dig out and dispose. Does not include transport to regional disposal facility or equivalent.
	Demolish and remove extra large tank clean (Thickener etc >30 m diameter) and disposal on-site/locally	Y		allow	$85,000		$0		Assume tank is clean - contents removed. If tank is full allow extra 30% for excavator and 2 men to dig out and dispose. Does not include transport to regional disposal facility or equivalent.
	Demolish and remove tank clean (Thickener etc) >50 m diameter and disposal on-site/locally	Y		allow	$100,000		$0		Estimate only - may require a detailed assessment from demolition expert due to specialised equipment required for removal. Does not include transport to regional disposal facility or equivalent.
	Removal of UG tank <5000 L - including pipes, bunds etc. and disposal on-site/locally	Y		allow	$21,000		$0		Assume tank is clean (contents removed), does not include transport to regional disposal facility or equivalent.
	Removal of UG tank 5000 L - 15000 L - including pipes, bunds etc. and disposal on-site/locally	Y		allow	$30,000		$0		Assume tank is clean (contents removed), does not include transport to regional disposal facility or equivalent.
	Remove small underground pipe and disposal on-site/locally	Y		m	$25.00		$0		For example: 300 mm pipes - 0.5 m deep, does not include transport to regional disposal facilities.
	Remove medium underground pipe and disposal on-site/locally	Y		m	$60.00		$0		For example: 300 mm pipes - 1 m deep, does not include transport to regional disposal facilities.
	Remove large underground pipe and disposal on-site/locally	Y		m	$165.00		$0		For example: 1 m pipes - 2 m deep.
	Remove above ground pipe (supported) and disposal on-site/locally	Y	1623.4	m	$12.00		$19,481	Includes pipeline from No 4 shaft to underground tank and ventilation shaft infrastructure, and pipelines connected to the above ground tank	~300 mm pipes and assumes pipes are in close proximity to infrastructure areas. Does not include transport to regional disposal facility or equivalent.
	Remove surface pipelines (unsupported) and disposal on-site/locally	Y		m	$15.00		$0		~300 mm pipes and assumes pipes are used for water transfer
	Remove pump and pontoon from a lake or dam including pipes and electrical supply or diesel tank/s and disposal on-site/locally	Y		allow	$150,000		$0		Assumes infrastructure is moored and requires barge mobilisation to sever the mooring and / or is a significant fixed structure for controlled release of water. Does not include transport to regional disposal facility or equivalent.
	Remove bitumen (car park and access roads) and dispose on-site/locally	Y		m2	$10.00		$0		Scalp bitumen and stabilised material. Generally haulage rates will be $0.60 - $1.20 / km, depending on truck fleet, loaders etc. For off-site disposal use alternate rate option and add $0.90 / km for transport.
	Remove bitumen (airstrip) and dispose on-site/locally	Y		m2	$20.00		$0		Scalp bitumen and stabilised material. Generally haulage rates will be $0.60 - $1.20 / km, depending on truck fleet, loaders etc. For off-site disposal use alternate rate option and add $0.90 / km for transport.
	Remove concrete pads & footings (<300 mm thickness) and disposal on-site/locally	Y	817.66	m2	$37.00		$30,253	Break up and remove concrete pads from Shaft 1 and 2 switchyard area - measured extent (388m2) and around small buildings. Assumes small building footprint plus 10% to account for aprons etc	Breaking up slab and disposal or for conversion to aggregate. Generally haulage rates will be $0.60 - $1.20 / km, depending on truck fleet, loaders etc. For off-site disposal use alternate rate option and add $0.90 / km for transport.
	Remove concrete pads & footings (>300 mm thickness) and disposal on-site/locally	Y		m2	$75.00		$0		Breaking up slab and disposal or for conversion to aggregate. Generally haulage rates will be $0.60 - $1.20 / km, depending on truck fleet, loaders etc. For off-site disposal use alternate rate option and add $0.90 / km for transport.
	Crush concrete to make road aggregate - 75 mm	Y		tonne	$17.00		$0		Does not include haulage of materials - assumes crushing plant is readily available.
	Crush concrete to make road aggregate - 50 mm	Y		tonne	$20.00		$0		Does not include haulage of materials - assumes crushing plant is readily available.
	Crush concrete to make road aggregate - 30 mm	Y		tonne	$22.00		$0		Does not include haulage of materials - assumes crushing plant is readily available.
	Remove fence (cyclone/wire fence) and disposal on-site/locally	Y	284	m	$20.00		$5,680	Remove cyclone fence surrounding switchyard (68m), around No 1 shaft and infrastructure (132m), around No 3 Shaft infrastructure (84m)	Roll up fence and remove posts.
						Termination of Services and Demolition Works Subtotal	$307,603		
Rail Infrastructure	Remove rail loop and spur, ballast etc. and disposal on-site/locally	Y		m	$60.00		$0		Remove all materials to allow area to be reshaped and rehabilitated - does not include transport to regional disposal facility or equivalent.
	Remove train loading facilities and disposal on-site/locally	Y		m2	$265.00		$0		Remove rail load point infrastructure including gantries and control structures. Does not include transport to regional disposal facility or equivalent.
	Reshape rail spur and load out areas. Does not include growth media and revegetation	Y		ha	$2,500		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation).
						Rail Infrastructure Subtotal	$0		

Contaminated Materials	Undertake a preliminary site investigation (Phase 1). This accounts for current and historical locations where areas of disturbance are clustered. If there are multiple cluster areas on site, multiple studies may be required.	**Y**		Cluster	**$15,000**		**$0**		The preliminary investigation would include at minimum a desktop assessment of the area and site history, incidents, etc. as per the National Environmental Protection (Site Contamination) Measure (NEPM) Phase 1 assessment (EP Act Section 389 (2) (iv)) or similar approved and recognised assessment method. A cluster may include: - Mine infrastructure (i.e., fuel / chemical store, workshop, vehicle wash-down, sewage treatment etc.) - Processing plants (i.e., ore and product storage, mine waste storage and disposal, rail load-out etc.) - Remote pit-top facilities (i.e., vehicle re-fuel, sewage treatment, secondary workshop, chemical
	Undertake an intrusive site investigation. This accounts for current and historical locations where areas of disturbance are clustered. If there are multiple cluster areas on site, multiple intrusive investigations should be included.	**Y**		Cluster	**$100,000**		**$0**		The intrusive investigation would include at minimum a site walkover and field sampling as per the National Environmental Protection (Site Contamination) Measure (NEPM) Phase 2 intrusive investigation (EP Act Section 389 (2) (iv)) or similar approved and recognised assessment method. Note: An intrusive investigation is not required for all contaminated areas and should be applied considering the rehabilitation program, site history, location, etc. A cluster area where it is highly anticipated that contamination has occurred (i.e. underground tanks / pipes that are known to have leaked, chemical stores with earthen bunds, around ineffective oil/water separators etc.) and further field work is required.
	Removal and disposal of contaminated water from tanks, bunded areas and sumps	**Y**		L	**$0.35**		**$0**		Cost for recent sump clean-up from resource activity - requires specialists to treat.
	Remove material (carbonaceous / metalliferous spillage or otherwise) from footprint of the process facility (leach pads) / stockpile area (ROM product) / roads and dump in a void on-site (Select Haul Distance from list)	**Y**		m3	**Select from List**			**Select Haul Distance Here**	This item includes scraping and removal of the volume of carbonaceous material using dozer, grader etc. to make safe an area and enable the establishment of rehabilitation.
	Load, cart and dispose of High Level contaminated material off site to a licensed landfill. Assumes cartage to a licensed landfill	**Y**		m3	**$700.00**		**$0**		Includes load, haul and dump fees to a licensed facility.
	Load, cart and disposal of Low Level contaminated material off site to a licensed landfill. Add $50/m3 for cartage to regional landfill	**Y**		m3	**$200.00**		**$0**		Includes load, haul and dump fees to a licensed facility.
	Onsite remediation of hydrocarbon contaminated soils manual land farming (Select Volume from List)	**Y**		m3	**Select from List**			**Select Volume Here**	Spreading of contaminated soils on a prepared surface and stimulation of aerobic microbial activity within the soils through aeration and/or the addition of minerals, nutrients and moisture to promote the aerobic degradation of organic chemicals - time frame of up to 24 months.
	Mobilisation of cement stabilisation plant and equipment for hydrocarbon (i.e., PAH, long chain hydrocarbons, etc.) contaminated soil treatment	**Y**		Item	**$150,000**		**$0**		Required if treatment of hydrocarbon contamination is required to be fast tracked.
	On-site remediation of hydrocarbon contaminated soils - using a mobile treatment unit	**Y**		m3	**$165.00**		**$0**		Additional cost as the treatment process is fast tracked.
	Remove and dispose of asbestos (<750 m2)	**Y**		m2	**$50.00**		**$0**		Where an assessment/estimation has been made to confirm the volume of asbestos to be removed.
	Remove and dispose of asbestos (>750 m2)	**Y**		m2	**$40.00**		**$0**		Where an assessment/estimation has been made to confirm the volume of asbestos to be removed.
	Remove and dispose of asbestos	**Y**		tonne	**$2,400**		**$0**		6 mm asbestos sheet approx. 15 kg / m2 = ~70 m2 per ton. Allowing $20 / m2 for removal, 4 hours trucking @$125 and $100 / t disposal plus 20% OHP = $2,400 / t
	Treatment of known Acid Sulfate Soils	**Y**		ha	**$2,580**		**$0**		Assumes ASS is treatable via neutralisation and does not require capping and isolation.
	Removal and disposal of plastic liner (i.e. dam, leach pad, sump etc.)	**Y**		m2	**$1.00**		**$0**		Provisional sum for cutting using ripping tynes and on-site disposal of the liner.
					Contaminated Materials Subtotal		**$0**		
Vents, Shafts and Boreholes	Seal portals / drifts (width >3 m) – backfill the access for at least 50 m against a concrete bulk head with drainage slots. The rate includes some reshaping of batters around the adit entrance. If concrete bulk head not required, reduce rate by 25%	**Y**		allow	**$250,000**		**$0**		Cost estimated from planned and executed works programs in NSW from multiple sites. Rate accounts for a range of factors including variations in depth and size, accessability limitations, requirements for extra roof and/or rib support, equipment transport into the underground etc.
	Seal small adits (width <3 m) – install 0.5 concrete plug 3 m back from adit and backfill with appropriate material. The rate includes some reshaping of the batter around the entrance of the adit	**Y**		allow	**$25,000**		**$0**		Cost estimated from planned and executed works programs in NSW from multiple sites. Rate assumes standard works program with suitable access, and additional roof and rib stabilisation works etc. is not required.
	Seal and rehabilitate ventilation fans shafts - allows for works in a remote location	**Y**	4	allow	**$150,000**		**$600,000**	**Seal and rehabilitate No 1, 2, 3 and 5 vent shafts**	Cost estimated from planned and executed works programs in NSW from multiple sites. Rate accounts for a range of factors including variations in depth and size, accessability limitations, equipment transport to the shaft etc.
	Install gate or grill over the adit (Where site might be used by bats)	**Y**		Item	**$200,000**		**$0**		Rate accounts for a range of factors including establishing clear access, and/or working in remote locations without services, and/or stabilisation works to prevent the entry collapsing and compromising the gate etc.

		Exploration boreholes – rehabilitate boreholes and drill pads as required	Y		depth (m)	$40.00		$0		Where multiple boreholes exist, this is the rate for the total cumulative depth of all boreholes (e.g. two boreholes at 100m depth each = 200m). Assumes a per metre drilling rate of ~$150 / m of which ~25 - 30% is for rehabilitation which may include a variety of works (i.e., cut casing and install cap, install poly pipe to facilitate back-filling, grout preparation, grouting and capping, reshaping / ripping the drill pad, ameliorating / seeding etc.)
		Exploration boreholes – backfill open bore holes with cuttings	Y		allow	$300.00		$0		May include cutting of casing, installation of a casing cap, and/or manually backfilling the hole with drill cuttings. Does not include reshaping / ripping the drill pad, amelioration / seeding etc.
		Exploration boreholes – grout and cap open bore holes	Y		allow	$7,950		$0		Includes grouting and capping 100 - 200 m exploration boreholes to meet the requirements of EDG01.
		Boreholes – cap and seal open bore holes with steel casing (i.e., goaf drainage etc.)	Y		allow	$6,960		$0		Holes deeper than 100 m - includes cutting steel collar 6 m below surface, grouting and
		Boreholes – cap and seal open bore holes - surface-to-in-seam gas drainage	Y		allow	$15,000		$0		Surface-to-in-seam gas drainage boreholes.
		Boreholes – cap and seal open bore holes - vertical gas drainage	Y		allow	$16,000		$0		Vertical gas drainage boreholes.
		Boreholes – grout (with concrete) cap and seal bore holes (i.e. where sealing aquifers)	Y		allow	$35,000		$0		Includes multi skin sleaves to prevent aquifer mixing.
		Boreholes – cap and seal service boreholes for UG operations	Y		allow	$45,000		$0		Includes large diameter boreholes used for supplying electricity (66kV), compressed air, water, solsenic etc.
						Vents, Shafts and Boreholes Subtotal		$600,000		
Roads and Tracks		Unsealed roads / vehicle park-up areas – minor works including deep rip and trim	Y		ha	$960.00		$0		Assumes ~6 m road width - 16H Grader @ $212 per hour.
		Unsealed roads / access tracks / vehicle park-up areas with windrows and/or small earthen bunds – minor earthworks and deep rip and trim	Y		ha	$1,500		$0		Assumes ~20 m road width - D10 Dozer @ $332 per hour.
		Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip and seed (pasture grass)	Y		ha	$3,698		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.
		Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	Y		ha	$4,485		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.

	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (pasture grass)	Y		ha	$3,820		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.
	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	Y		ha	$4,595		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.
	Remove stabilised material (blue metal, aggregate etc.) from roadways and disposal on-site/locally (haul distance < 1km)	Y		m3	$4.45		$0	< =1km	D10 Rip and push into void at $270/hr, 0.2ha/hr, 150mm deep. 657 Scrapers cut to spoil at $430/hr, 150BCM/hr/machine, Ancillary watercart and grader at $0.75c/m3
						Roads and Tracks Subtotal	$0		
Earthworks / Structural Works (Landform Establishment)	Major bulk pushing to achieve grades nominated in the approval/permit – Select Push Length	Y		m3	Select from List			Select Push Length Here	Major bulk pushing to achieve grades nominated in the approval/permit
	Minor reshaping and pushing	Y		ha	$3,900		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation).
	Fill dams, voids etc. - Source local material, cart and spread to cap or backfill, cap thickness determined by approval / permit (Select Haul Distance from List)	Y		m3	Select from List			Select Haul Distance Here	This item includes the volume of material requiring backfill using an excavator and scraper to fill the void and enable the establishment of rehabilitation.
	Shotcrete application on cuttings and steep slopes	Y		m2	$185.00		$0		This rate is used to rehabilitate steep slopes of weathered rock, roadway cuttings, etc that cannot be cut back and stabilised.
	Trim, rock rake & deep rip (includes levelling / landscaping and rip in 1 direction)	Y	2.05	ha	$960.00		$1,968	Rehabilitate disturbed areas around No 1 and No 2 shaft areas (0.1 ha), No 3 shaft (0.3 ha) and No 5 shaft (1.65 ha)	16H Grader @ $212 per hour - ripping in 1 direction only.
	Deep rip hard stand / lay down areas	Y		ha	$960.00		$0		D10 dozer @ $332 per hour - deep rip in 2 directions @ 5 m spacing ~3 hr per hectare.
	Structural works, banks, waterways - contour banks, drainage channels and other soil conservation measures	Y		ha	$1,600		$0		Combination of dozer and excavator work. Small dozer (D6 or similar) @ ~$200 per hour plus grader @ $212 per hour for ~4 hours each per ha.
	Construction of spine drains / drop structures and/or stabilising water course entry points - required for large catchments	Y		m2	$35.00		$0		Installation of on-site rock material (rip-rap) where managing water run-off from disturbed land and/or upon entry to water courses - prevents erosion of gully head (assumes competent material is locally available)
						Earthworks / Structural Works (Landform Establishment) Subtotal	$1,968		
Land Preparation and Revegetation (Growth Media Development and Ecosystem Establishment)	Source, cart and spread growth media - haul distance <1 km	Y	3075	m3	$3.26		$10,013	< =1km It is assumed that minor volumes of topsoil will be available locally or will not be required given the natural topsoil	610 m3/hr with 4 x 657 scrapers at $430/hr, D10 trimming at $270/hr 3ha/day at 150mm depth
	Planting mature trees (>15 cm)	Y		allow	$20.00		$0		4 m centres.
	Planting tube stock (<15 cm)	Y		allow	$10.00		$0		4 m centres.
	Direct seeding / fertiliser (pasture grass species)	Y		ha	$1,240		$0		Rate can fluctuate however this is a suitable standard rate.
	Direct seeding / fertiliser (tree or native grass species)	Y	2.05	ha	$2,095		$4,295	Rehabilitate disturbed areas around No 1 and No 2 shaft areas (0.1 ha), No 3 shaft (0.3 ha) and No 5 shaft (1.65 ha)	Rate can fluctuate however this is a suitable standard rate.
	Hydro-seeding with straw mulching and bitumen tack	Y		m2	$1.80		$0		Rate can fluctuate however this is a suitable standard rate.
	Single application of fertiliser (pasture)	Y		ha	$420.00		$0		Assumes 250 kg / ha. These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
	Single application of fertiliser (trees)	Y		ha	$140.00		$0		These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
	Spoil amelioration (adding lime / gypsum etc.)	Y		ha	$860.00		$0		Assumes 2.5 t / ha as an average application rate.
	growth media amelioration with biosolids	Y		ha	$1,015		$0		Recent experience with agronomy projects.
	Construct no-climb stock fence around rehabilitated areas	Y		m	$9.50		$0		Standard rate for no-climb stock fencing.
	Construct standard stock fence around rehabilitated areas	Y	250	m	$4.00		$1,000	Construct stock fence around each sealed vent shaft - assumed 50m per shaft	Standard rate for standard stock fencing.
	Purchase and erect warning signs	Y	8	allow	$250.00		$2,000	Assumed 2 signs per shaft location	Compliance with AS 1319-1994 - Safety signs for the occupational environment - installed every 25 m.
	Supply from external sources virgin excavated natural material (VENM) for growth media.	Y		m3	$80.80		$0		D7 to spread material at $205/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $70/m3 for imported fill material
	Supply from external sources a combination of virgin excavated natural material (VENM) and spoil from large excavation for filing voids and/or capping etc.	Y		m3	$72.50		$0		D10 push into void at $270/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $60/m3 for imported fill material
						Land Preparation and Revegetation (Growth Media Development and Ecosystem Establishment) Subtotal	$17,308		
Water Management	Clean water dams to be retained after decommissioning – make safe and minor earthworks	Y		allow	$2,500		$0		Provisional sum for earthworks and revegetation required to rehabilitate dam batters etc suitable for re-use by an alternate land-user - D6 Dozer (or similar) @ ~$200 per hour and pasture grass.
	Remove sediments from the floor of the dam to enable it to be converted into clean water structure (Select Haul Distance from list)	Y		m3	Select from List			Select Haul Distance Here	This item includes the volume of contaminated sediment requiring removal using an excavator, truck and dozer to clean out the dam.
	Removal of evaporation fans and/or other water transfer and management infrastructure	Y		allow	$25,000		$0		Provisional sum for removal of water management infrastructure.
						Water Management Subtotal	$0		
Maintenance of Rehabilitated Areas	Maintenance of areas that have been shaped and seeded and revegetation has been 'successful'	Y	2.05	ha	$900.00		$1,845	Maintenance of rehabed areas	Rehabilitation maintenance might include re-seeding, watering, fertilising, minor re-shaping, erosion control, inspections/audits - does not include major repair.
	Existing rehabilitation repair - minor	Y	1.025	ha	$1,200		$1,230	Assumed minor repair over 50% of rehabed area	Areas requiring minor repair - rills, minor growth media replacement.

	Existing rehabilitation repair - moderate	Y		ha	$1,700		$0		Areas requiring moderate repair - rills, significant growth media replacement.
	Existing rehabilitation repair - major	Y		ha	$2,500		$0		Areas requiring major repair - rills, gullies, growth media replacement, some level of additional surface water management.
	Existing rehabilitation repair - total failure of landform	Y		ha	$40,000		$0		Areas that require extensive rehabilitation repair - re-design and re-construction of landform.
						Maintenance of Rehabilitated Areas Subtotal	**$3,075**		
Additional Items	Demolish and remove vent fan and associated infrastructure	y	4		**This is**	$25,000.00	**$100,000**	**provisional sum for the demolition of No 1, 2, 3 and 5 vent infrastructure. Shaft 3 covered but not sealed, building remains**	This item includes **<<to be added by the operator>>**
	Other 2 <insert>	N			**deliberately**				This item includes **<<to be added by the operator>>**
	Other 3 <insert>	N			**left blank**				This item includes **<<to be added by the operator>>**
						Additional Items Subtotal	**$100,000**		
Total Cost for Infrastructure Domain							**$1,029,954**		

Underground Operations

Domain 2c: Tailings & Rejects

Total Cost for Tailings & Rejects Domain **$0**

Additional Assumptions: *Record any relevant assumptions to this domain below:*

	Key Rehabilitation Area Data for Domain	**Enter data below manually**
	Total Landform Establishment:	
	Total Growth Media Development:	
	Total Ecosystem Establishment:	

Management Precinct	Activity / Description	Applicable (Y or N)	Quantity	Unit	Default Unit Rate	Alternative Unit Rate	Total Cost	Basis for Costs Estimation and Additional Relevant Information	Description / Notes:
Contaminated Materials	Undertake a preliminary site investigation (Phase 1). This accounts for current and historical locations where areas of disturbance are clustered. If there are multiple cluster areas on site, multiple studies may be required.	Y		Cluster	$15,000		$0		The preliminary investigation would include at minimum a desktop assessment of the area and site history, incidents, etc. as per the National Environmental Protection (Site Contamination) Measure (NEPM) Phase 1 assessment (EP Act Section 389 (2) (iv)) or similar approved and recognised assessment method. A cluster may include: - Mine infrastructure (i.e., fuel / chemical store, workshop, vehicle wash-down, sewage treatment etc.) - Processing plants (i.e., ore and product storage, mine waste storage and disposal, rail load-out etc.) - Remote pit-top facilities (i.e., vehicle re-fuel, sewage treatment, secondary workshop, chemical
	Undertake an intrusive site investigation. This accounts for current and historical locations where areas of disturbance are clustered. If there are multiple cluster areas on site, multiple intrusive investigations should be included.	Y		Cluster	$100,000		$0		The intrusive investigation would include at minimum a site walkover and field sampling as per the National Environmental Protection (Site Contamination) Measure (NEPM) Phase 2 intrusive investigation (EP Act Section 389 (2) (iv)) or similar approved and recognised assessment method. Note: An intrusive investigation is not required for all contaminated areas and should be applied considering the rehabilitation program, site history, location, etc. A cluster area where it is highly anticipated that contamination has occurred (i.e. underground tanks / pipes that are known to have leaked, chemical stores with earthen bunds, around ineffective oil/water separators etc.) and further field work is required.
	Removal and disposal of contaminated water from tanks, bunded areas and sumps	Y		L	$0.35		$0		Cost for recent sump clean-up from resource activity - requires specialists to treat.
	Remove material (carbonaceous / metalliferous spillage or otherwise) from footprint of the process facility (leach pads) / stockpile area (ROM product) / roads and dump in a void on-site (Select Haul Distance from list)	Y		m3	Select from List			Select Haul Distance Here	This item includes scraping and removal of the volume of carbonaceous material using dozer, grader etc. to make safe an area and enable the establishment of rehabilitation.
	Load, cart and dispose of High Level contaminated material off site to a licensed landfill. Assumes cartage to a licensed landfill	Y		m3	$700.00		$0		Includes load, haul and dump fees to a licensed facility.
	Load, cart and disposal of Low Level contaminated material off site to a licensed landfill. Add $50/m3 for cartage to regional landfill	Y		m3	$200.00		$0		Includes load, haul and dump fees to a licensed facility.
	Onsite remediation of hydrocarbon contaminated soils manual land farming (Select Volume from List)	Y		m3	Select from List			Select Volume Here	Spreading of contaminated soils on a prepared surface and stimulation of aerobic microbial activity within the soils through aeration and/or the addition of minerals, nutrients and moisture to promote the aerobic degradation of organic chemicals - time frame of up to 24 months.
	Mobilisation of cement stabilisation plant and equipment for hydrocarbon (i.e., PAH, long chain hydrocarbons, etc.) contaminated soil treatment	Y		Item	$150,000		$0		Required if treatment of hydrocarbon contamination is required to be fast tracked.
	On-site remediation of hydrocarbon contaminated soils - using a mobile treatment unit	Y		m3	$165.00		$0		Additional cost as the treatment process is fast tracked.
	Remove and dispose of asbestos (<750 m2)	Y		m2	$50.00		$0		Where an assessment/estimation has been made to confirm the volume of asbestos to be removed.
	Remove and dispose of asbestos (>750 m2)	Y		m2	$40.00		$0		Where an assessment/estimation has been made to confirm the volume of asbestos to be removed.
	Remove and dispose of asbestos	Y		tonne	$2,400		$0		6 mm asbestos sheet approx. 15 kg / m2 = ~70 m2 per ton. Allowing $20 / m2 for removal, 4 hours trucking @$125 and $100 / t disposal plus 20% OHP = $2,400 / t
	Treatment of known Acid Sulfate Soils	Y		ha	$2,580		$0		Assumes ASS is treatable via neutralisation and does not require capping and isolation.
	Removal and disposal of plastic liner (i.e. dam, leach pad, sump etc.)	Y		m2	$1.00		$0		Provisional sum for cutting using ripping tynes and on-site disposal of the liner.
						Contaminated Materials Subtotal	$0		
Roads and Tracks	Unsealed roads / vehicle park-up areas – minor works including deep rip and trim	Y		ha	$960.00		$0		Assumes ~6 m road width - 16H Grader @ $212 per hour.
	Unsealed roads / access tracks / vehicle park-up areas with windrows and/or small earthen bunds – minor earthworks and deep rip and trim	Y		ha	$1,500		$0		Assumes ~20 m road width - D10 Dozer @ $332 per hour.
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip and seed (pasture grass)	Y		ha	$3,698		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	Y		ha	$4,485		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.
	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (pasture grass)	Y		ha	$3,820		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.

	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	Y		ha	$4,595		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.
	Remove stabilised material (blue metal, aggregate etc.) from roadways and disposal on-site/locally (Select Haul Distance from list)	Y		m3	Select from List			Select Haul Distance Here	This item includes the scraping and removal of the volume of stabilised material from the road, laydown or other surface using an excavator, dozer and grader to enable the establishment of rehabilitation.
						Roads and Tracks Subtotal	$0		
Earthworks / Structural Works (Landform Establishment)	Major bulk pushing to achieve grades nominated in the approval/permit – Select Push Length	Y		m3	Select from List			Select Push Length Here	Major bulk pushing to achieve grades nominated in the approval/permit
	Minor reshaping and pushing	Y		ha	$3,900		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation).
	Fill dams, voids etc. - Source local material, cart and spread to cap or backfill, cap thickness determined by approval / permit (Select Haul Distance from List)	Y		m3	Select from List			Select Haul Distance Here	This item includes the volume of material requiring backfill using an excavator and scraper to fill the void and enable the establishment of rehabilitation.
	Trim, rock rake & deep rip (includes levelling / landscaping and rip in 1 direction)	Y		ha	$960.00		$0		16H Grader @ $212 per hour - ripping in 1 direction only.
	Structural works, banks, waterways - contour banks, drainage channels and other soil conservation measures	Y		ha	$1,600		$0		Combination of dozer and excavator work. Small dozer (D6 or similar) @ ~$200 per hour plus grader @ $212 per hour for ~4 hours each per ha.
	Construction of spine drains / drop structures and/or stabilising water course entry points - required for large catchments	Y		m2	$35.00		$0		Installation of on-site rock material (rip-rap) where managing water run-off from disturbed land and/or upon entry to water courses - prevents erosion of gully head (assumes competent material is locally available)

						Earthworks / Structural Works (Landform Establishment) Subtotal	$0		
Mine Waste	Reshaping, capping / sealing of a structure unlikely to present difficulties due to chemistry – reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), and physical properties (i.e., shear strength, etc.) - where the mine waste stream is geochemically benign and / or the strength condition within the upper 4 - 6 m meets the target shear strength profile.	Y		ha	$81,000		$0		This includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume material with the appropriate chemical and physical properties. This rate assumes suitable capping material is available on site within 10 km, and an average cap thickness of approximately 1 m including growth media. Water quality from runoff, seepage etc. meets site-specific environment water quality
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Reshaping, capping / sealing of structure likely to present moderate difficulties due to chemistry – reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), or physical properties – shear strength, etc. limiting equipment choice.	Y		ha	$108,000		$0		This item includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume of material to cap / cover facilities where the tailings or rejects base is at a strength that enables economically efficient construction methods with small plant. This rate assumes suitable capping material is available on site within 10 km, and an average cap thickness of approximately 2 m including growth media. This may require additional materials (such as capillary breaks, geofabric, etc.), specific material types (e.g. acid neutralising / consuming materials, competent rock etc.) , and associated activities (i.e., load / haul / place / crush / screen / borrow etc.). Costs for haulage of specialised materials must be added separately if required.
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Reshaping, capping / sealing of structure likely to present considerable difficulties due to reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), and / or physical properties (low shear strength greatly limiting equipment selection for material placement etc.)	Y		ha	$170,000		$0		This item includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume of material to cap / cover facilities of high geochemical risk, and / or low shear strength that prohibits economically efficient construction methods. This rate assumes suitable capping material/s are available on site within 10 km, and an average cap thickness of approximately 2.5 m including growth media. This may require additional materials (i.e., capillary breaks, geofabric, etc.), specific material types (e.g. acid neutralising / consuming materials, competent rock etc.), and associated activities (i.e., load / haul / place / crush / screen / borrow etc.). Costs for haulage of specialised materials must be added separately if required.
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
						Mine Waste Subtotal	$0		
Land Preparation and Revegetation (Growth Media Development and Ecosystem Establishment)	Source, cart and spread growth media (Select Haul Distance from List)	Y		m3	Select from List			Select Haul Distance Here	If topsoil is not available on-site, then Virgin Excavated Natural Material (VENM) may need to be externally sourced.
	Direct seeding / fertiliser (pasture grass species)	Y		ha	$1,240		$0		Rate can fluctuate however this is a suitable standard rate.
	Direct seeding / fertiliser (tree or native grass species)	Y		ha	$2,095		$0		Rate can fluctuate however this is a suitable standard rate.
	Hydro-seeding with straw mulching and bitumen tack	Y		m2	$1.80		$0		Rate can fluctuate however this is a suitable standard rate.
	Single application of fertiliser (pasture)	Y		ha	$420.00		$0		Assumes 250 kg / ha. These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
	Single application of fertiliser (trees)	Y		ha	$140.00		$0		These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
	Spoil amelioration (adding lime / gypsum etc.)	Y		ha	$860.00		$0		Assumes 2.5 t / ha as an average application rate.
	growth media amelioration with biosolids	Y		ha	$1,015		$0		Recent experience with agronomy projects.
	Construct no-climb stock fence around rehabilitated areas	Y		m	$9.50		$0		Standard rate for no-climb stock fencing.
	Construct standard stock fence around rehabilitated areas	Y		m	$4.00		$0		Standard rate for standard stock fencing.
	Purchase and erect warning signs	Y		allow	$250.00		$0		Compliance with AS 1319-1994 - Safety signs for the occupational environment - installed every 25 m.

	Supply from external sources virgin excavated natural material (VENM) for growth media.	Y		m3	$80.80		$0		D7 to spread material at $205/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $70/m3 for imported fill material
	Supply from external sources a combination of virgin excavated natural material (VENM) and spoil from large excavation for filing voids and/or capping etc.	Y		m3	$72.50		$0		D10 push into void at $270/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $60/m3 for imported fill material
Land Preparation and Revegetation (Growth Media Development and Ecosystem Establishment) Subtotal							$0		
Water Management	Clean water dams to be retained after decommissioning – make safe and minor earthworks	Y		allow	$2,500		$0		Provisional sum for earthworks and revegetation required to rehabilitate dam batters etc suitable for re-use by an alternate land-user - D6 Dozer (or similar) @ ~$200 per hour and pasture grass
	Remove sediments from the floor of the dam to enable it to be converted into clean water structure (Select Haul Distance from list)	Y		m3	Select from List			Select Haul Distance Here	This item includes the volume of contaminated sediment requiring removal using an excavator, truck and dozer to clean out the dam.
Water Management Subtotal							$0		
Maintenance of Rehabilitated Areas	Maintenance of areas that have been shaped and seeded and revegetation has been 'successful'	Y		ha	$900		$0		Rehabilitation maintenance might include re-seeding, watering, fertilising, minor re-shaping, erosion control, inspections/audits - does not include major repair
	Existing rehabilitation repair - minor	Y		ha	$1,200		$0		Areas requiring minor repair - rills, minor growth media replacement.
	Existing rehabilitation repair - moderate	Y		ha	$1,700		$0		Areas requiring moderate repair - rills, significant growth media replacement.
	Existing rehabilitation repair - major	Y		ha	$2,500		$0		Areas requiring major repair - rills, gullies, growth media replacement, some level of additional surface water management.
	Existing rehabilitation repair - total failure of landform	Y		ha	$40,000		$0		Areas that require extensive rehabilitation repair - re-design and re-construction of landform.
Maintenance of Rehabilitated Areas Subtotal							$0		
Additional Items	Other 1 <insert>	N			This is				This item includes **<<to be added by the operator>>**
	Other 2 <insert>	N			deliberately				This item includes **<<to be added by the operator>>**
	Other 3 <insert>	N			left blank				This item includes **<<to be added by the operator>>**
Additional Items Subtotal							$0		
Total Cost for Tailings & Rejects Domain							**$0**		

Underground Operations

Domain 3c: Overburden & Waste

Total Cost for Overburden & Waste Domain **$0**

Additional Assumptions: *Record any relevant assumptions to this domain below:*

	Key Rehabilitation Area Data for Domain	**Enter data below manually**
	Total Landform Establishment:	
	Total Growth Media Development:	
	Total Ecosystem Establishment:	

Management Precinct	Activity / Description	Applicable (Y or N)	Quantity	Unit	Default Unit Rate	Alternative Unit Rate	Total Cost	Basis for Costs Estimation and Additional Relevant Information	Description / Notes:
Contaminated Materials	Treatment of known Acid Sulfate Soils	Y		ha	$2,580		$0		Assumes ASS is treatable via neutralisation and does not require capping and isolation.
	Removal and disposal of plastic liner (i.e. dam, leach pad, sump etc.)	Y		m2	$1.00		$0		Provisional sum for cutting using ripping tynes and on-site disposal of the liner.
						Contaminated Materials Subtotal	$0		
Roads and Tracks	Unsealed roads / vehicle park-up areas – minor works including deep rip and trim	Y		ha	$960.00		$0		Assumes ~6 m road width - 16H Grader @ $212 per hour.
	Unsealed roads / access tracks / vehicle park-up areas with windrows and/or small earthen bunds – minor earthworks and deep rip and trim	Y		ha	$1,500		$0		Assumes ~20 m road width - D10 Dozer @ $332 per hour.
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip and seed (pasture grass)	Y		ha	$3,698		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.
	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	Y		ha	$4,485		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.
	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (pasture grass)	Y		ha	$3,820		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.
	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	Y		ha	$4,595		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.
	Remove stabilised material (blue metal, aggregate etc.) from roadways and disposal on-site/locally (Select Haul Distance from list)	Y		m3	Select from List			Select Haul Distance Here	This item includes the scraping and removal of the volume of stabilised material from the road, laydown or other surface using an excavator, dozer and grader to enable the establishment of rehabilitation.
						Roads and Tracks Subtotal	$0		
Earthworks / Structural Works (Landform Establishment)	Major bulk pushing to achieve grades nominated in the approval/permit – Select Push Length	Y		m3	Select from List			Select Push Length Here	Major bulk pushing to achieve grades nominated in the approval/permit
	Minor reshaping and pushing	Y		ha	$3,900		$0		D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation).
	Fill dams, voids etc. - Source local material, cart and spread to cap or backfill, cap thickness determined by approval / permit (Select Haul Distance from List)	Y		m3	Select from List			Select Haul Distance Here	This item includes the volume of material requiring backfill using an excavator and scraper to fill the void and enable the establishment of rehabilitation.
	Shotcrete application on cuttings and steep slopes	Y		m2	$185.00		$0		This rate is used to rehabilitate steep slopes of weathered rock, roadway cuttings, etc that cannot be cut back and stabilised.
	Trim, rock rake & deep rip (includes levelling / landscaping and rip in 1 direction)	Y		ha	$960.00		$0		16H Grader @ $212 per hour - ripping in 1 direction only.
	Structural works, banks, waterways - contour banks, drainage channels and other soil conservation measures	Y		ha	$1,600		$0		Combination of dozer and excavator work. Small dozer (D6 or similar) @ ~$200 per hour plus grader @ $212 per hour for ~4 hours each per ha.
	Construction of spine drains / drop structures and/or stabilising water course entry points - required for large catchments	Y		m2	$35.00		$0		Installation of on-site rock material (rip-rap) where managing water run-off from disturbed land and/or upon entry to water courses - prevents erosion of gully head (assumes competent material is locally available).
						Earthworks / Structural Works (Landform Establishment) Subtotal	$0		
Mine Waste	Reshaping, capping / sealing of a structure unlikely to present difficulties due to chemistry – reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), and physical properties (i.e., shear strength, etc.) - where the mine waste stream is geochemically benign and / or the strength condition within the upper 4 - 6 m meets the target shear strength profile.	Y		ha	$81,000		$0		This includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume material with the appropriate chemical and physical properties. This rate assumes suitable capping material is available on site within 10 km, and an average cap thickness of approximately 1 m including growth media. Water quality from runoff, seepage etc. meets site-specific environment water quality values.
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.).
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.).

	Reshaping, capping / sealing of structure likely to present moderate difficulties due to chemistry – reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), or physical properties – shear strength, etc. limiting equipment choice.	Y		ha	$108,000		$0		This item includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume of material to cap / cover facilities where the tailings or rejects base is at a strength that enables economically efficient construction methods with small plant. This rate assumes suitable capping material is available on site within 10 km, and an average cap thickness of approximately 2 m including growth media. This may require additional materials (such as capillary breaks, geofabric, etc.), specific material types (e.g. acid neutralising / consuming materials, competent rock etc.) , and associated activities (i.e., load / haul / place / crush / screen / borrow etc.). Costs for haulage of specialised materials must be added separately if required.
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Reshaping, capping / sealing of structure likely to present considerable difficulties due to reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), and / or physical properties (low shear strength greatly limiting equipment selection for material placement etc.)	Y		ha	$170,000		$0		This item includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume of material to cap / cover facilities of high geochemical risk, and / or low shear strength that prohibits economically efficient construction methods. This rate assumes suitable capping material/s are available on site within 10 km, and an average cap thickness of approximately 2.5 m including growth media. This may require additional materials (i.e., capillary breaks, geofabric, etc.), specific material types (e.g. acid neutralising / consuming materials, competent rock etc.), and associated activities (i.e., load / haul / place / crush / screen / borrow etc.). Costs for haulage of specialised materials must be added
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	Y		allow	Use alternate rate cell		$0		Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.)
						Mine Waste Subtotal	$0		
Land Preparation and Revegetation (Growth Media Development and Ecosystem Establishment)	Source, cart and spread growth media (Select Haul Distance from List)	Y		m3	Select from List			Select Haul Distance Here	If topsoil is not available on-site, then Virgin Excavated Natural Material (VENM) may need to be externally sourced.
	Planting mature trees (>15 cm)	Y		allow	$20.00		$0		4 m centres.
	Planting tube stock (<15 cm)	Y		allow	$10.00		$0		4 m centres.
	Direct seeding / fertiliser (pasture grass species)	Y		ha	$1,240		$0		Rate can fluctuate however this is a suitable standard rate.
	Direct seeding / fertiliser (tree or native grass species)	Y		ha	$2,095		$0		Rate can fluctuate however this is a suitable standard rate.
	Hydro-seeding with straw mulching and bitumen tack	Y		m2	$1.80		$0		Rate can fluctuate however this is a suitable standard rate.
	Single application of fertiliser (pasture)	Y		ha	$420.00		$0		Assumes 250 kg / ha. These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
	Single application of fertiliser (trees)	Y		ha	$140.00		$0		These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
	Spoil amelioration (adding lime / gypsum etc.)	Y		ha	$860.00		$0		Assumes 2.5 t / ha as an average application rate.
	growth media amelioration with biosolids	Y		ha	$1,015		$0		Recent experience with agronomy projects.
	Construct no-climb stock fence around rehabilitated areas	Y		m	$9.50		$0		Standard rate for no-climb stock fencing.
	Construct standard stock fence around rehabilitated areas	Y		m	$4.00		$0		Standard rate for standard stock fencing.
	Purchase and erect warning signs	Y		allow	$250.00		$0		Compliance with AS 1319-1994 - Safety signs for the occupational environment - installed every 25 m.
	Supply from external sources virgin excavated natural material (VENM) for growth media.	Y		m3	$80.80		$0		D7 to spread material at $205/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $70/m3 for imported fill material
	Supply from external sources a combination of virgin excavated natural material (VENM) and spoil from large excavation for filing voids and/or capping etc.	Y		m3	$72.50		$0		D10 push into void at $270/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $60/m3 for imported fill material
						Land Preparation and Revegetation (Growth Media Development and Ecosystem Establishment) Subtotal	$0		
Water Management	Clean water dams to be retained after decommissioning – make safe and minor earthworks	Y		allow	$2,500		$0		Provisional sum for earthworks and revegetation required to rehabilitate dam batters etc suitable for re-use by an alternate land-user - D6 Dozer (or similar) @ ~$200 per hour and pasture grass
	Remove sediments from the floor of the dam to enable it to be converted into clean water structure (Select Haul Distance from list)	Y		m3	Select from List			Select Haul Distance Here	This item includes the volume of contaminated sediment requiring removal using an excavator, truck and dozer to clean out the dam.
						Water Management Subtotal	$0		

Maintenance of Rehabilitated Areas	Maintenance of areas that have been shaped and seeded and revegetation has been 'successful'	**Y**		ha	**$900.00**		**$0**		Rehabilitation maintenance might include re-seeding, watering, fertilising, minor re-shaping, erosion control, inspections/audits - does not include major repair
	Existing rehabilitation repair - minor	**Y**		ha	**$1,200**		**$0**		Areas requiring minor repair - rills, minor growth media replacement.
	Existing rehabilitation repair - moderate	**Y**		ha	**$1,700**		**$0**		Areas requiring moderate repair - rills, significant growth media replacement.
	Existing rehabilitation repair - major	**Y**		ha	**$2,500**		**$0**		Areas requiring major repair - rills, gullies, growth media replacement, some level of additional surface water management.
	Existing rehabilitation repair - total failure of landform	**Y**		ha	**$40,000**		**$0**		Areas that require extensive rehabilitation repair - re-design and re-construction of landform.
Maintenance of Rehabilitated Areas Subtotal							**$0**		
Additional Items	Other 1 <insert>	**N**			**This is**				This item includes **<<to be added by the operator>>**
	Other 2 <insert>	**N**			**deliberately**				This item includes **<<to be added by the operator>>**
	Other 3 <insert>	**N**			**left blank**				This item includes **<<to be added by the operator>>**
Additional Items Subtotal							**$0**		
Total Cost for Overburden & Waste Domain							**$0**		

Underground Operations

Domain 4c: Subsidence and Management

Total Cost for Subsidence and Management Activities **$100,000**

Additional Assumptions: *Record any relevant assumptions to this domain below:*

General management items not already covered in the Russell Vale Pit Top and REA tab	**Key Rehabilitation Area Data for Domain**	**Enter data below manually**
It is assumed that no subsidence management is required within the SCA area.	**Total Landform Establishment:**	
	Total Growth Media Development:	
	Total Ecosystem Establishment:	

Management Precinct	Activity / Description	Applicable (Y or N)	Quantity	Unit	Default Unit Rate	Alternative Unit Rate	Total Cost	Basis for Costs Estimation and Additional Relevant Information	Description / Notes:
Subsidence Repairs	Minor stabilisation works and maintenance of mine subsidence areas - ripping etc.	Y		ha	$1,500		$0		D8 Dozer @ $240 per hour and/or grader @ $160 per hour.
	Crack filling to repair subsidence impacts	Y		m	$1,485		$0		Undertake more substantial works to backfill cracks and/or sink holes (e.g., filling with mulch prior to grouting, grouting, etc.)
	Water course restoration to repair subsidence impacts	Y		allow	Use alternate rate cell		$0		Undertake more substantial works to remediate water courses (e.g., channel bed repairs, rock bar repairs, swamp stabilisation etc.)
	Create cut-through to re-establish natural water courses/drainage channels following subsidence	Y		allow	$3,000		$0		Includes all earthworks and revegetation required to re-establish the natural drainage profile of the subsided area.
						Subsidence Repairs Subtotal	$0		
Vents, Shafts and Boreholes	Maintenance and monitoring of sealed adits/portals and shafts (for a total of 5 years)	Y	4	allow	$25,000		$100,000	Maintenance of the above sealed vent shafts	Estimate to undertake periodic inspections by a qualified person and provide a completions report for DRG sign-off.
						Vents, Shafts and Boreholes Subtotal	$100,000		
Water Management	On-site treatment of contaminated water due to high salt (includes removal of metals etc, brine disposal and cost of mobile water treatment unit)	Y		ML	$3,600		$0		Rate can fluctuate depending on treatment type however this is a suitable standard rate for current programs at mining operations.
	On-site treatment of contaminated water due to low pH (incudes removal of metals etc, neutralisation treatments and cost of mobile water treatment unit	Y		ML	$1,500		$0		Rate can fluctuate depending on treatment type however this is a suitable standard rate for current programs at mining operations.
						Water Management Subtotal	$0		
Creek Diversions	Repairs and/or stabilisation of new or compromised water course diversion	Y		m	$2,500		$0		Assumes material is suitable for revegetating and has a reasonable chance of stabilising.
	Long term maintenance of water course diversion – Channel constructed through backfilled material	Y		m	$1,500		$0		Assumes maintenance has been kept up and significant works are not required.
	Long term maintenance of water course diversion – Channel constructed through competent material	Y		m	$750.00		$0		Assumes maintenance has been kept up and significant works are not required.
	Installation of rock armouring	Y		m2	$6.00		$0		Assumes competent material is locally available - multiply costs by 2 for sourcing and transporting from offsite location.
						Creek Diversions Subtotal	$0		
Land Management	Pest management on buffer lands, non-disturbed, and rehabilitated areas	Y		ha	$150.00		$0		Feral animal baiting programs if required and waste materials required to be removed.
	Land management of undisturbed areas (rehabilitation, weeds, ferals, erosion and sediment control works)	Y		ha	$400.00		$0		Undisturbed areas within the lease boundary that require land management activities.
						Land Management Subtotal	$0		
Heritage Items	The restoration and care and maintenance of items that have heritage significance	Y		allow	Use alternate rate cell		$0		Item for the redistribution of Aboriginal artefacts, preservation of European heritage items or a combination of activities.
						Heritage Items Subtotal	$0		
Sundry Items	Development of an 'Unplanned' Project Closure Plan - for either State Significant or Non State Significant Developments	Y		allow	Select from List			Select Category Here	Provisional sum to be used to refine the conceptual closure plan into a detailed closure plan with execution strategies for rehabilitation activities.
	DRG tender preparation and assessment, stakeholder consultation, risk assessment facilitation and management, statutory reporting and instruments, permitting and compliance requirements, document and data management	Y		allow	Use alternate rate cell		$0		Provisional sum for the NSW Government to prepare tender documentation (i.e. demolition, waste disposal, earthworks, environmental management etc.) manage stakeholders and establish permitting and compliance requirements for closure.
	Site security during closure	Y		yr.	$75,000		$0		Provisional sum for site security measures required during closure. This includes nightly patrols and first response in the event of an out of hours incident.
	HAZMAT Clean-up - cleaning and decontaminating plant and equipment, chemical storage locations, oil and grease traps, tanks, vessels, and pipe work etc	Y		allow	$100,000		$0		Provisional sum to perform the site clean-up and ensuring the demolition program is not interrupted due to potential contamination of waste streams.
	Removal and disposal of radiation devices	Y		each	$25,000		$0		Provisional sum for removal and disposal of monitoring devices on conveyors using a radiation source (i.e., Americium – 241, Plutonium – 238, Caesium - 137 etc)
	Additional fees for accessing State, Crown or other public lands for rehabilitation/remediation activities	Y		allow	Use alternate rate cell		$0		Provisional sum.
						Sundry Items Subtotal	$0		
Mobilisation and Demobilisation	Mobilisation & Demobilisation for small mine or quarry	Y		Item	$40,000		$0		May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
	Mobilisation & Demobilisation (Distance to site <150 km)	Y		item	$100,000		$0		May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
	Mobilisation & Demobilisation (Distance to site >150 km but <500 km)	Y		item	$150,000		$0		May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
	Mobilisation & Demobilisation (Distance to site >500 km but <1000 km)	Y		item	$300,000		$0		May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
	Mobilisation & Demobilisation (Distance to site >1000 km)	Y		item	$500,000		$0		May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
						Mobilisation and Demobilisation Subtotal	$0		

Additional Items	Other 1 <insert>	**N**			**This is**				This item includes **<<to be added by the operator>>**
	Other 2 <insert>	**N**			**deliberately**				This item includes **<<to be added by the operator>>**
	Other 3 <insert>	**N**			**left blank**				This item includes **<<to be added by the operator>>**
						Additional Items Subtotal	**$0**		
Total Cost for Subsidence and Management Activities							**$100,000**		

Assumptions and rehabilitation requirements

List or record any assumptions made when completing this tool:

Post mining land use will be as per the MOP with the pit top area to be rehabilitated to be suitable for residential or commercial development
No topsoil will be required on the hardstand areas at the pit top as these will be used for residential or commercial development post mining
All shaft locations will be topsoiled and revegetated.
Access roads and firetrails will be retained for Water NSW use.
Rehabilitation of Sydney Water tanks and roads are not WCL responsibility
Rehabilitation of the REA will include capping with 300mm clay material, 500mm subsoil and 150mm topsoil
Only the area of the REA within the mining lease has been included in this cost estimate. A separate security is in place with council for the area outside the mining lease.
The Stormwater control dam, discharge weir, fire dam, pit top dam and 2 dams in the underground mining area will be retained at closure.
No subsidence remediation is required.
All infrastructure will be demolished and removed
0.5 m of stabilised material will be removed from hardstands and roads
Carbonaceous material will be removed from stockpiles, CHPP area and disposed to the REA prior to capping
Stabilised material and bitumen will be disposed to the nearest portals and shafts prior to sealing
Where required, topsoil will be spread to 150mm.

Justification for Change of Rates in the DRG's Rehabilitation Cost Estimation Tool

Domain	Activity	DRG unit/rate	Adopted Rates	Justification

In completing the Rehabilitation Cost Estimation, we are seeking an adjustment to the rates currently utilised in the DRG Rehabilitation Cost Estimation Tool. A justification for the rate change by a third party has been included and I confirm that only the rates identified in the above table have been altered in the Rehabilitation Cost Estimation Tool.

Authrorisation Representatives Name ..... **Date** .....

Authorisation Representatives Role / Responsibility ..... **Signature** .....

Definitions for the DRG Rehabilitation Cost Estimation Tool

Term	Meaning
adit	Entrance to an underground mine which is horizontal or nearly horizontal, by which the mine can be entered, drained of water and ventilated
amelioration	Addition of materials to change physical or chemical properties or soil, tailings, or other materials.
aquifer	Has the same meaning as it has in the *Water Management Act 2000* .
armouring	Application of a self-sustaining mechanism for erosion control typically utilising rock.
authority	Means an exploration licence, an assessment lease or a mining lease granted under the *Mining Act 1992* .
authorisation	Means an authority, a small-scale title or an environmental assessment permit granted under section 252 in force under the *Mining Act 1992* .
backfill	The act of placing material to refill an excavation or void (such as an open cut or dam).
ballast (rail)	A free draining coarse aggregate or metallurgical slag used to support railway tracks and allow for drainage.
batters	Slopes manufactured during mining and/or excavation activities.
borehole	A hole made by drilling or boring, but excludes sampling and coring using hand held equipment; and petroleum wells.
capillary break	A layer of coarse material placed between finer-textured materials to prevent the vertical movement of water (and associated salts) by surface tension from the lower, finer-textured material into the upper finer-textured material (such as topsoil or growth media). It can also function to limit root penetration into the underlying seal and more than one capillary break can be present within a cover design.
capping / sealing	The act of applying material (such as clay) in a usually engineered design to seal off underlying material (such as waste, contaminated soil or spoil) in order to prevent exposure of this material to the environment and outside conditions.
CHPP	Coal Handling and Processing Plant - A plant used to upgrade the quality of coal including crushing, sizing washing and drying.
Clearing of vegetation	Any one or more of the following: • cutting down, felling, thinning, lopping, logging or removing vegetation • killing, destroying, poisoning, ringbarking, uprooting or burning vegetation.
contaminated	Condition or state where there is/are potentially hazardous substance(s) at concentrations above background or recommended land use levels and where assessment shows it poses, or is likely to pose, an immediate or long-term hazard to human health or the environment.
contour banks	Earthen structures constructed across cultivated slopes.
crusher/crushing plant	Equipment that crushes ore or rock - also referred to as a mill
demountable	A transportable prefabricated structure/building produced off site and transported to site, designed to be movable rather than permanently located.
Department	The Division of Resources and Geosciences within the NSW Department of Planning and Environment.
desiccation	Process of removing moisture or extreme drying.
de-water	Removal or draining groundwater or surface water from a structure by pumping or evaporation.
diversion	A drain or channel that diverts stormwater runoff around a site or landform.
earthworks	Equipment activity involving the placement and working of large amounts of earth to engineering or other design specification (such as cut and fill operations for roads, dams, landforms, etc.).
evaporation fans	Fans used to evaporate water as an alternative to discharging water off-site.
excavation	The removal of the surface layer of land to a depth greater than 500 mm from the natural surface level of that land.

exploration	Has the same meaning as it has in the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* .
gas drainage	A method of reducing the in-situ gas content of the seam to within acceptable limits by drilling holes into the seam or surrounding strata ahead of mining.
goaf	The space remaining following extraction of the mineral.
groundwater	Water that occurs beneath the ground surface in the saturated zone.
hardstand	A hard-surfaced area on which heavy vehicles can be parked and equipment can be stored.
haul road	Roads used to transport mine materials (product and waste).
HAZMAT	Anything that, when produced, stored, moved, used or otherwise dealt with without adequate safeguards to prevent it from escaping, may cause injury or death or damage to life, property or the environment.
Item of heritage significance	Means: • any heritage items listed in one or more of the following: — the Commonwealth Heritage List — the World Heritage List — the National Heritage List — the State Heritage Register — an Environmental Planning Instrument • any relic (being any deposit, object or material evidence which relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and which is 50 or more years old) • within State Conservation Areas: — items that are listed on the DECC Historic Heritage Information Management System — in all other circumstances, any deposit, object or material evidence relating to the settlement or occupation of New South Wales or a part of New South Wales (not being Aboriginal settlement or occupation) if the deposit, object or material evidence is more than 25 years old at the date of the interference or removal.
leach	Dissolution and removal of a soluble substance from a substrate.
mine subsidence	Movement of strata resulting from the extraction of coal, metals or minerals and incorporates vertical ground movement (strain) and differential vertical movement (tilt).
open cut	Open-cut mining occurs where mineral deposits are close to the surface and typically involves blasting and removing surface layers of soil and rock to reach the mineral deposit. Also referred to as open-pit, or open-cast mining.
overburden	Top soil/strata overlying a coal seam.
petroleum title	means an exploration licence, assessment lease, production lease or special prospecting authority in force under the *Petroleum (Onshore) Act 1991* .
petroleum well	Means a hole made by drilling or boring in connection with prospecting for petroleum or operations for the recovery of petroleum, but excludes: • sampling and coring using hand held equipment • a hole constructed and operated for the following purposes where the operation of that hole does not involve fracture stimulation or the recovery of petroleum: — stratigraphic definition — seismic (for example shot holes, geophone, tilt meters bores)

DRG Schedule of Rehabilitation Costs

Reference Data V4

Item	Activity Description	Unit	Unit Prices	Justification and Assumptions for Proposed Rates
Termination of Services and Demolition Works				
1.01	Disconnect and terminate all services (Water, electricity, gas etc at point of attachment to site)	allow	$ 35,000	For disconnection of all services, at building boundaries, physical cut at the point of attachment or distribution location. If infrastructure is not consolidated (i.e., administration, camp and workshops are in separate places), consider multiple disconnection fees.
1.02	Disconnect and terminate services at remote areas (i.e. pump stations, remote workshops, sewage treatment plant etc.)	allow	$ 5,500	Used for infrastructure remote from primary connection. Can also be used for small mines / quarries that do not have dedicated supplies from supply authorities such as steel lattice power lines.
1.03	Removal of low/medium voltage powerlines including disconnection, rolling up the wires and removing the poles - does not include the removal of substations	km	$ 15,000	Applies to power lines on stobie, concrete or similar poles.
1.04	Removal of power lines on tower or lattice structures (this includes disconnection, rolling up the wires and removing the structures) - does not include the removal of substations	km	$ 100,000	Applies to power lines on steel tower and steel lattice structures assuming 3 towers / km.
1.05	Remove significant rail, road, water course overpass - manage potential interuptions and demolish and remove bridge supports/pylons/bridge structure etc. and dispose of waste material on-site/locally	Item	$ 350,000	Major structures constructed for the purposes of mining related works - does not include transport to regional disposal facility or equivalent.
1.06	Demolish and/or remove substations (assumes they are in a closed building). Dispose of waste material on-site/locally	m^2	$ 600.00	Simple structure to demolish. Assumes single story building and segregation of contents for scrap as applicable.
1.07	Demolish and remove switchyard. Dispose of waste material on-site/locally	m^2	$ 55.00	Includes demolition and removal of all switchgear and transformers etc. and segregation of contents for scrap as applicable.
1.08	Demolish and remove demountable structures on concrete stumps. Assumes not being re-used	m^2	$ 40.00	Crib huts, temporary offices and other 'non permanent' structures. Does not include transport to regional disposal facility or equivalent.
1.09	Demolish and remove small buildings/tanks (admin buildings, single story accommodation etc) and disposal on-site/locally	m^2	$ 65.00	Simple structure to demolish, assumes no greater than 2 stories high. Does not include transport to regional disposal facility or equivalent.
1.10	Demolish and remove light industrial buildings and disposal on-site/locally	m^2/floor	$ 115.00	Needs to be calculated per floor/level (Assume 1 floor/level = 3-4 m). Does not include transport to regional disposal facility or equivalent.
1.11	Demolish and remove industrial buildings (workshops tyre change and servicing area etc **not CHPP/process plant**) and disposal on-site/locally	m^2/floor	$ 180.00	Needs to be calculated per floor/level (Assume 1 floor/level = 3-4 m). Does not include transport to regional disposal facility or equivalent.
1.12	Demolish and remove CHPP/process plant (**include the area of each floor of the structure**) and disposal on-site/locally	m^2/floor	$ 265.00	Needs to be calculated per floor/level (Assume 1 floor/level = 3-4 m). Does not include transport to regional disposal facility or equivalent.
1.13	Collapse, demolish and remove washery, crushers, hoppers, mills, furnaces, agglomeration, electrowinning, floatation, sizing stations, rotary breakers, etc (include the area of each floor of the structure) and disposal on-site/locally	m^2/floor	$ 265.00	Needs to be calculated per floor/level (Assume 1 floor/level = 3-4 m). Does not include transport to regional disposal facility or equivalent.
1.14	Collapse, demolish and remove **stacker OR reclaimer (radial or luffing etc. with maneuverability for stockpile control)** and disposal on-site/locally	allow	$ 1,000,000	Cost for removal of stacker or reclaim unit only. Does not include terminate services, remove rails and ballast etc. Does not include transport to regional disposal facility or equivalent.
1.15	Collapse, demolish and remove **bucket wheel stacker/reclaimer** and disposal on-site/locally	allow	$ 2,500,000	Cost for just removal of the bucket wheel stacker/reclaim units. Does not include terminate services, remove rails and ballast etc. Does not include transport to regional disposal facility or equivalent.
1.16	Remove stacker/reclaimer rails and ballast and demolish and remove concrete footings etc and disposal on-site/locally	m	$ 75.00	Includes both rails, does **not** include the conveyor system. Does not include transport to regional disposal facility or equivalent.
1.17	Collapse, Cut and Remove 5000T coal silo and disposal on-site/locally	allow	$ 100,000	Collapse structure and remove. Does not include transport to regional disposal facility or equivalent.
1.18	Collapse, Cut and Remove 3000 T coal silo and disposal on-site/locally	allow	$ 85,000	Collapse structure and remove. Does not include transport to regional disposal facility or equivalent.
1.19	Collapse, Cut and Remove 1250 T coal silo and disposal on-site/locally	allow	$ 65,000	Collapse structure and remove. Does not include transport to regional disposal facility or equivalent.
1.20	Collapse, Cut and Remove rail loading bins and disposal on-site/locally	allow	$ 65,000	Collapse structure and remove. Does not include transport to regional disposal facility or equivalent.
1.21	Demolish and remove **onground** conveyors, transfer stations & gantries (scrap only – does not include dismantling for reuse at another site) and disposal on-site/locally	m	$ 210.00	Estimate for on-ground conveyor including anything up to 10 m off the ground. Does not include transport to regional disposal facility or equivalent.
1.22	Demolish and remove **elevated** conveyors, transfer stations & gantries (scrap only, does not include dismantling for reuse at another site) and disposal on-site/locally	m	$ 370.00	Estimate for elevated conveyor up to ~10 m off the ground. Does not include transport to regional disposal facility or equivalent.
1.23	Demolish and remove **overhead** conveyors, transfer stations & gantries (scrap only, does not include dismantling for reuse at another site) and disposal on-site/locally. **This may include small scale fixed material stacking infrastructure**	m	$ 1,200	Estimate for overhead conveyor including conveyors that are >10 m off the ground that require a crane to remove. Does not include transport to regional disposal facility or equivalent.
1.24	Demolish reclaim tunnel, cut reo and expose reclaim conveyor, then **collapse into the reclaim tunnel void** (Does **not** include excavation to expose reclaim tunnel, removal of conveyor or backfilling void)	m^2	$ 80.00	Does not include conveyor removal or backfill.
1.25	Remove and demolish conveyor from reclaim tunnel (Does **not** include excavation and demolition of reclaim tunnel roof)	m	$ 150.00	Due to no canopy or infrastructure attached.
1.26	Demolition of reclaim tunnel concrete (Assumes complete removal and **dumping in mine pit void**)	m	$ 950.00	Assumes this area will be used for another land-use that requires the structure to be dug up and re-buried somewhere else.
1.27	Demolition and removal of vent raise fans, electrical substation and winch and disposal on-site/locally	allow	$ 25,000	Does **not** include filling and capping the shaft. Does not include transport to regional disposal facility or equivalent.
1.28	Demolish and remove small tank **clean** (Thickener etc 3 - 9 m diameter) and disposal on-site/locally	allow	$ 10,000	Assume tank is clean - contents removed. If tank is full allow extra 30% for excavator and 2 men to dig out and dispose. Does not include transport to regional disposal facility or equivalent.
1.29	Demolish and remove medium tank **clean** (Thickener etc 10 - 15 m diameter) and disposal on-site/locally	allow	$ 30,000	Assume tank is clean - contents removed. If tank is full allow extra 30% for excavator and 2 men to dig out and dispose. Does not include transport to regional disposal facility or equivalent.
1.30	Demolish and remove large tank **clean** (Thickener etc 15 - 30 m diameter) and disposal on-site/locally	allow	$ 45,000	Assume tank is clean - contents removed. If tank is full allow extra 30% for excavator and 2 men to dig out and dispose. Does not include transport to regional disposal facility or equivalent.
1.31	Demolish and remove extra large tank **clean** (Thickener etc >30 m diameter) and disposal on-site/locally	allow	$ 85,000	Assume tank is clean - contents removed. If tank is full allow extra 30% for excavator and 2 men to dig out and dispose. Does not include transport to regional disposal facility or equivalent.
1.32	Demolish and remove tank **clean** (Thickener etc) **>50 m diameter** and disposal on-site/locally	allow	$ 100,000	Estimate only - may require a detailed assessment from demolition expert due to specialised equipment required for removal. Does not include transport to regional disposal facility or equivalent.
1.33	Removal of UG tank <5000 L - including pipes, bunds etc. and disposal on-site/locally	allow	$ 21,000	Assume tank is clean (contents removed), does not include transport to regional disposal facility or equivalent.
1.34	Removal of UG tank 5000 L - 15000 L - including pipes, bunds etc. and disposal on-site/locally	allow	$ 30,000	Assume tank is clean (contents removed), does not include transport to regional disposal facility or equivalent.
1.35	Remove small underground pipe and disposal on-site/locally	m	$ 25.00	For example: 300 mm pipes - 0.5 m deep, does not include transport to regional disposal facility or equivalent.
1.36	Remove medium underground pipe and disposal on-site/locally	m	$ 60.00	For example: 500 mm pipes - 1 m deep, does not include transport to regional disposal facility or equivalent.
1.37	Remove large underground pipe and disposal on-site/locally	m	$ 165.00	For example: 1 m pipes - 2 m deep.

Item	Activity Description	Unit	Unit Prices	Justification and Assumptions for Proposed Rates
1.38	Remove above ground pipe (supported) and disposal on-site/locally	m	$ 12.00	~300 mm pipes and assumes pipes are in close proximity to infrastructure areas. Does not include transport to regional disposal facility or equivalent.
1.39	Remove surface pipelines (unsupported) and disposal on-site/locally	m	$ 15.00	~300 mm pipes and assumes pipes are used for water transfer between pits (or similar) and remotely located. Does not include transport to regional disposal facility or equivalent.
1.40	Remove pump and pontoon from a lake or dam including pipes and electrical supply or diesel tank/s and disposal on-site/locally	allow	$ 150,000	Assumes infrastructure is moored and requires barge mobilisation to sever the mooring and / or is a significant fixed structure for controlled release of water. Does not include transport to regional disposal facility or equivalent.
1.41	Remove bitumen (car park and access roads) and dispose on-site/locally	m^2	$ 10.00	Scalp bitumen and stabilised material. Generally haulage rates will be $0.60 - $1.20 / km, depending on truck fleet, loaders etc. For off-site disposal use alternate rate option and add $0.90 / km for transport.
1.42	Remove bitumen (airstrip) and dispose on-site/locally	m^2	$ 20.00	Scalp bitumen and stabilised material. Generally haulage rates will be $0.60 - $1.20 / km, depending on truck fleet, loaders etc. For off-site disposal use alternate rate option and add $0.90 / km for transport.
1.43	Remove concrete pads & footings (<300 mm thickness) and disposal on-site/locally	m^2	$ 37.00	Breaking up slab and disposal or for conversion to aggregate. Generally haulage rates will be $0.60 - $1.20 / km, depending on truck fleet, loaders etc. For off-site disposal use alternate rate option and add $0.90 / km for transport.
1.44	Remove concrete pads & footings (>300 mm thickness) and disposal on-site/locally	m^2	$ 75.00	Breaking up slab and disposal or for conversion to aggregate. Generally haulage rates will be $0.60 - $1.20 / km, depending on truck fleet, loaders etc. For off-site disposal use alternate rate option and add $0.90 / km for transport.
1.45	Crush concrete to make road aggregate - **75 mm**	tonne	$ 17.00	Does not include haulage of materials - assumes crushing plant is readily available.
1.46	Crush concrete to make road aggregate - **50 mm**	tonne	$ 20.00	Does not include haulage of materials - assumes crushing plant is readily available.
1.47	Crush concrete to make road aggregate - **30 mm**	tonne	$ 22.00	Does not include haulage of materials - assumes crushing plant is readily available.
1.48	Remove fence (cyclone/wire fence) and disposal on-site/locally	m	$ 20.00	Roll up fence and remove posts.
Rail Infrastructure				
2.01	Remove rail loop and spur, ballast etc. and disposal on-site/locally	m	$ 60.00	Remove all materials to allow area to be reshaped and rehabilitated - does not include transport to regional disposal facility or equivalent.
2.02	Remove train loading facilities and disposal on-site/locally	m^2	$ 265.00	Remove rail load point infrastructure including gantries and control structures. Does not include transport to regional disposal facility or equivalent.
2.03	Reshape rail spur and load out areas. Does not include growth media and revegetation	ha	$ 2,500	D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation).
Contaminated Materials				
3.01a	Undertake a preliminary site investigation (Phase 1). This accounts for current and historical locations where areas of disturbance are clustered. If there are multiple cluster areas on site, multiple studies may be required.	Cluster	$ 15,000	The preliminary investigation would include at minimum a desktop assessment of the area and site history, incidents, etc. as per the National Environmental Protection (Site Contamination) Measure (NEPM) Phase 1 assessment (EP Act Section 389 (2) (iv)) or similar approved and recognised assessment method. A cluster may include: - Mine infrastructure (i.e., fuel / chemical store, workshop, vehicle wash-down, sewage treatment etc.) - Processing plants (i.e., ore and product storage, mine waste storage and disposal, rail load-out etc.) - Remote pit-top facilities (i.e., vehicle re-fuel, sewage treatment, secondary workshop, chemical storage etc.)
3.01b	Undertake an intrusive site investigation. This accounts for current and historical locations where areas of disturbance are clustered. If there are multiple cluster areas on site, multiple intrusive investigations should be included.	Cluster	$ 100,000	The intrusive investigation would include at minimum a site walkover and field sampling as per the National Environmental Protection (Site Contamination) Measure (NEPM) Phase 2 intrusive investigation (EP Act Section 389 (2) (iv)) or similar approved and recognised assessment method. Note: An intrusive investigation is not required for all contaminated areas and should be applied considering the rehabilitation program, site history, location, etc. A cluster area where it is highly anticipated that contamination has occurred (i.e. underground tanks / pipes that are known to have leaked, chemical stores with earthen bunds, around ineffective oil/water separators etc.) and further field work is required involving intrusive investigation.
3.02	Removal and disposal of contaminated water from tanks, bunded areas and sumps	L	$ 0.35	Cost for recent sump clean-up from resource activity - requires specialists to treat.
3.03-	Remove material (carbonaceous / metalliferous spillage or otherwise) from footprint of the process facility (leach pads) / stockpile area (ROM product) / roads and dump in a void on-site (Select Haul Distance from list)	m^3	Select from List	This item includes scraping and removal of the volume of carbonaceous material using dozer, grader etc. to make safe an area and enable the establishment of rehabilitation.
3.03a	Remove material (carbonaceous / metalliferous spillage or otherwise) from footprint of the process facility (leach pads) / stockpile area (ROM product) / roads and dump in a void on-site (haul distance < 1km)	m^3	$ 3.90	D10 Rip and push into void at $270/hr, 0.2ha/hr, 150mm deep. 657 Scrapers cut to spoil at $430/hr, 150BCM/hr/machine, Ancillary watercart and grader at $0.75c/m3
3.03b	Remove material (carbonaceous / metalliferous spillage or otherwise) from footprint of the process facility (leach pads) / stockpile area (ROM product) / roads and dump in a void on-site (haul distance >1 km but <2 km)	m^3	$ 5.31	D10 Rip and push into void at $270/hr, 0.2ha/hr, 150mm deep. 657 Scrapers cut to spoil at $430/hr, 130BCM/hr/machine, Ancillary watercart and grader at $0.75c/m3
3.03c	Remove material (carbonaceous / metalliferous spillage or otherwise) from footprint of the process facility (leach pads) / stockpile area (ROM product) / roads and dump in a void on-site (haul distance >2 km but <5 km)	m^3	$ 6.67	D10 Rip and push into stockpile at $270/hr, 0.2ha/hr, 150mm deep. Excavator ($220/hr) load Artic Trucks (90c/km)
3.03d	Remove material (carbonaceous / metalliferous spillage or otherwise) from footprint of the process facility (leach pads) / stockpile area (ROM product) / roads and dump in a void on-site (haul distance >5 km)	m^3	$ 8.92	As above, generally overhaul rates will be 60c-$1.2, depending on truck fleet, loaders etc. - assumed 7.5 km. If haul distance is greater than 7.5 km, alternate rate option should be used - $8.92 + additional km x $0.90.
3.04	Load, cart and dispose of High Level contaminated material off site to a licensed landfill. Assumes cartage to a licensed landfill	m^3	$ 700.00	Includes load, haul and dump fees to a licensed facility.
3.05	Load, cart and disposal of Low Level contaminated material off site to a licensed landfill. Add $50/$m^3$ for cartage to regional landfill	m^3	$ 200.00	Includes load, haul and dump fees to a licensed facility.
3.06-	Onsite remediation of hydrocarbon contaminated soils manual land farming (Select Volume from List)	m^3	Select from List	Spreading of contaminated soils on a prepared surface and stimulation of aerobic microbial activity within the soils through aeration and/or the addition of minerals, nutrients and moisture to promote the aerobic degradation of organic chemicals - time frame of up to 24 months.
3.06a	Onsite remediation of hydrocarbon contaminated soils (<50 m^3) - manual land farming	m^3	$ 55.00	Current rates still adequate and recommend continue to allow for economies of scale.
3.06b	Onsite remediation of hydrocarbon contaminated soils (>50 m^3 but <100 m^3) - manual land farming	m^3	$ 44.00	Current rates still adequate and recommend continue to allow for economies of scale.
3.06c	Onsite remediation of hydrocarbon contaminated soils (>100 m^3 but <500 m^3) - manual land farming	m^3	$ 33.00	Current rates still adequate and recommend continue to allow for economies of scale.
3.06d	Onsite remediation of hydrocarbon contaminated soils (>500 m^3) - manual land farming	m^3	$ 30.00	Current rates still adequate and recommend continue to allow for economies of scale.
3.07	Mobilisation of cement stabilisation plant and equipment for hydrocarbon (i.e., PAH, long chain hydrocarbons, etc.) contaminated soil treatment	Item	$ 150,000	Required if treatment of hydrocarbon contamination is required to be fast tracked.
3.08	On-site remediation of hydrocarbon contaminated soils - using a mobile treatment unit	m^3	$ 165.00	Additional cost as the treatment process is fast tracked.
3.09	Remove and dispose of asbestos (<750 m^2)	m^2	$ 50.00	Where an assessment/estimation has been made to confirm the volume of asbestos to be removed.

Item	Activity Description	Unit	Unit Prices	Justification and Assumptions for Proposed Rates
3.10	Remove and dispose of asbestos (>750 m^2)	m^2	$ 40.00	Where an assessment/estimation has been made to confirm the volume of asbestos to be removed.
3.11	Remove and dispose of asbestos	tonne	$ 2,400	6 mm asbestos sheet approx. 15 kg / m^2 = ~70 m^2 per ton. Allowing $20 / m^2 for removal, 4 hours trucking @$125 and $100 / t disposal plus 20% OHP = $2,400 / t.
3.12	Treatment of known Acid Sulfate Soils	ha	$ 2,580	Assumes ASS is treatable via neutralisation and does not require capping and isolation.
3.13	Removal and disposal of plastic liner (i.e. dam, leach pad, sump etc.)	m^2	$ 1.00	Provisional sum for cutting using ripping tynes and on-site disposal of the liner.

Item	Activity Description	Unit	Unit Prices	Justification and Assumptions for Proposed Rates
Vents, Shafts and Boreholes				
4.01	Seal portals / drifts (width >3 m) – backfill the access for at least 50 m against a concrete bulk head with drainage slots. The rate includes some reshaping of batters around the adit entrance. If concrete bulk head not required, reduce rate by 25%	allow	$ 250,000	Cost estimated from planned and executed works programs in NSW from multiple sites. Rate accounts for a range of factors including variations in depth and size, accessability limitations, requirements for extra roof and/or rib support, equipment transport into the underground etc.
4.02	Seal small adits (width <3 m) – install 0.5 concrete plug 3 m back from adit and backfill with appropriate material. The rate includes some reshaping of the batter around the entrance of the adit	allow	$ 25,000	Cost estimated from planned and executed works programs in NSW from multiple sites. Rate assumes standard works program with suitable access, and additional roof and rib stabilisation works etc. is not required.
4.03	Seal and rehabilitate ventilation fans shafts - **allows for works in a remote location**	allow	$ 150,000	Cost estimated from planned and executed works programs in NSW from multiple sites. Rate accounts for a range of factors including variations in depth and size, accessability limitations, equipment transport to the shaft etc.
4.04	Maintenance and monitoring of sealed adits/portals and shafts (for a total of 5 years)	allow	$ 25,000	Estimate to undertake periodic inspections by a qualified person and provide a completions report for DRG sign-off.
4.05	Install gate or grill over the adit (Where site might be used by bats)	Item	$ 200,000	Rate accounts for a range of factors including establishing clear access, and/or working in remote locations without services, and/or stabilisation works to prevent the entry collapsing and compromising the gate etc.
4.06a	Exploration boreholes – rehabilitate boreholes and drill pads as required	depth (m)	$ 40.00	Where multiple boreholes exist, this is the rate for the total cumulative depth of all boreholes (e.g. two boreholes at 100m depth each = 200m). Assumes a per metre drilling rate of ~$150 / m of which ~25 - 30% is for rehabilitation which may include a variety of works (i.e., cut casing and install cap, install poly pipe to facilitate back-filling, grout preparation, grouting and capping, reshaping / ripping the drill pad, amelioration / seeding etc.)
4.06b	Exploration boreholes – backfill open bore holes with cuttings	allow	$ 300.00	May include cutting of casing, installation of a casing cap, and/or manually backfilling the hole with drill cuttings. Does not include reshaping / ripping the drill pad, amelioration / seeding etc.
4.07	Exploration boreholes – grout and cap open bore holes	allow	$ 7,950	Includes grouting and capping 100 - 200 m exploration boreholes to meet the requirements of EDG01.
4.08	Boreholes – cap and seal open bore holes with steel casing (i.e., goaf drainage etc.)	allow	$ 6,960	Holes deeper than 100 m - includes cutting steel collar 6 m below surface, grouting and capping.
4.09	Boreholes – cap and seal open bore holes - surface-to-in-seam gas drainage	allow	$ 15,000	Surface-to-in-seam gas drainage boreholes.
4.10	Boreholes – cap and seal open bore holes - vertical gas drainage	allow	$ 16,000	Vertical gas drainage boreholes.
4.11	Boreholes – grout (with concrete) cap and seal bore holes (i.e. where sealing aquifers)	allow	$ 35,000	Includes multi skin sleaves to prevent aquifer mixing.
4.12	Boreholes – cap and seal service boreholes for UG operations	allow	$ 45,000	Includes large diameter boreholes used for supplying electricity (66kV), compressed air, water, solsenic etc.
Roads and Tracks				
5.01	Unsealed roads / vehicle park-up areas – minor works including deep rip and trim	ha	$ 960	Assumes ~6 m road width - 16H Grader @ $212 per hour.
5.02	Unsealed roads / access tracks / vehicle park-up areas with windrows and/or small earthen bunds – minor earthworks and deep rip and trim	ha	$ 1,500	Assumes ~20 m road width - D10 Dozer @ $332 per hour.
5.03	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip and seed (pasture grass)	ha	$ 3,698	D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.
5.04	Unsealed roads / vehicle park-up areas – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	ha	$ 4,485	D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.
5.05	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (pasture grass)	ha	$ 3,820	D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - pasture grass seed.
5.06	Unsealed roads / haul roads / vehicle park-up areas with windrows and/or small earthen bunds – Minor earthworks, final trim and deep rip, ameliorate and seed (native tree/shrub/grass)	ha	$ 4,595	D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation) - tree/shrub seed.
5.07-	Remove stabilised material (blue metal, aggregate etc.) from roadways and disposal on-site/locally (Select Haul Distance from list)	m^3	Select from List	This item includes the scraping and removal of the volume of stabilised material from the road, laydown or other surface using an excavator, dozer and grader to enable the establishment of rehabilitation.
5.07a	Remove stabilised material (blue metal, aggregate etc.) from roadways and disposal on-site/locally (haul distance < 1km)	m^3	$ 4.45	D10 Rip and push into void at $270/hr, 0.2ha/hr, 150mm deep. 657 Scrapers cut to spoil at $430/hr, 150BCM/hr/machine, Ancillary watercart and grader at $0.75c/m3
5.07b	Remove stabilised material (blue metal, aggregate etc.) from roadways and disposal on-site/locally (haul distance >1 km but <2 km)	m^3	$ 5.64	D10 Rip and push into void at $270/hr, 0.2ha/hr, 150mm deep. 657 Scrapers cut to spoil at $430/hr, 130BCM/hr/machine, Ancillary watercart and grader at $0.75c/m3
5.07c	Remove stabilised material (blue metal, aggregate etc.) from roadways and disposal on-site/locally (haul distance >2 km but <5 km)	m^3	$ 7.20	D10 Rip and push into stockpile at $270/hr, 0.2ha/hr, 150mm deep. Excavator ($220/hr) load Artic Trucks (90c/km)
5.07d	Remove stabilised material (blue metal, aggregate etc.) from roadways and dump in a void on-site (haul distance >5 km)	m^3	$ 9.45	Generally overhaul rates will be 60c-$1.2, depending on truck fleet, loaders etc. - assumed 7.5 km. If haul distance is greater than 7.5 km, alternate rate option should be used - $9.45 + additional km x $0.90.
Open Cut				
6.01	Active pit area – benches blasted and doze to acceptable grade	Lm	$ 1.70	Blasting at 90c/m3, D11 push at $350 and 375 bcm/hr (80c/m3).
6.02	Drill & blast faces to make safe	m^3	$ 0.90	Bulk Drilling say 8*9 pattern, assuming a stem height of 6 m, charge length of 19 m, explosive density of 0.9, diameter of 229 mm, explosives at 665.3 kg/hole with a powder factor of 0.37 with an approximate bench height of 25 m will allow drilling and blasting at $0.90/bcm.
6.03	High wall treatment – (trench and safety berm)	m	$ 90.00	D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour including revegetation with pasture grass.
Earthworks / Structural Works				
7.01-	Major bulk pushing to achieve grades nominated in the approval/permit – **Select Push Length**	m^3	Select from List	Major bulk pushing to achieve grades nominated in the approval/permit
7.01a	Major bulk pushing to achieve grades nominated in the approval/permit – 50 m push length	m^3	$ 0.80	D11 push at $350 and 400 bcm/hr
7.01b	Major bulk pushing to achieve grades nominated in the approval/permit – 50 m-75 m push length	m^3	$ 1.14	D11 push at $350 and 375 bcm/hr
7.01c	Major bulk pushing to achieve grades nominated in the approval/permit – 75 m-100 m push length)	m^3	$ 1.42	D11 push at $350 and 250 bcm/hr
7.01d	Major bulk pushing to achieve grades nominated in the approval/permit – 150 m push length)	m^3	$ 1.89	D11 push at $350 and 175 bcm/hr
7.02	Minor reshaping and pushing	ha	$ 3,900	D10 Dozer @ $332 per hour and 16H Grader @ $212 per hour (50% utilisation).
7.03	Structural works, banks, waterways - contour banks, drainage channels and other soil conservation measures	ha	$ 1,600	Combination of dozer and excavator work. Small dozer (D6 or similar) @ ~$200 per hour plus grader @ $212 per hour for ~4 hours each per ha.
7.04	Construction of spine drains / drop structures and/or stabilising water course entry points - required for large catchments	m^2	$ 35.00	Installation of on-site rock material (rip-rap) where managing water run-off from disturbed land and/or upon entry to water courses - prevents erosion of gully head (assumes competent material is locally available).
Mine Waste				
8.01	Reshaping, capping / sealing of a structure unlikely to present difficulties due to chemistry – reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), and physical properties (i.e., shear strength, etc.) - where the mine waste stream is geochemically benign and / or the strength condition within the upper 4 - 6 m meets the target shear strength profile.	ha	$ 81,000	This includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume material with the appropriate chemical and physical properties. This rate assumes suitable capping material is available on site within 10 km, and an average cap thickness of approximately 1 m including growth media. Water quality from runoff, seepage etc. meets site-specific environment water quality values.
8.01a	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	allow	Use alternate rate cell	Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.).
8.01b	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	allow	Use alternate rate cell	Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.).

Item	Activity Description	Unit	Unit Prices	Justification and Assumptions for Proposed Rates
8.02	Reshaping, capping / sealing of structure likely to present moderate difficulties due to chemistry – reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), or physical properties – shear strength, etc. limiting equipment choice.	ha	$ 108,000	This item includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume of material to cap / cover facilities where the tailings or rejects base is at a strength that enables economically efficient construction methods with small plant. This rate assumes suitable capping material is available on site within 10 km, and an average cap thickness of approximately 2 m including growth media. This may require additional materials (such as capillary breaks, geofabric, etc.), specific material types (e.g. acid neutralising / consuming materials, competent rock etc.) , and associated activities (i.e., load / haul / place / crush / screen / borrow etc.). Costs for haulage of specialised materials must be added separately if required.
8.02a	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	allow	Use alternate rate cell	Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.).
8.02b	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	allow	Use alternate rate cell	Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.).
8.03	Reshaping, capping / sealing of structure likely to present considerable difficulties due to reactive materials (ARD / AMD / PAF / NMD / carbonaceous / saline), and / or physical properties (low shear strength greatly limiting equipment selection for material placement etc.)	ha	$ 170,000	This item includes sourcing, carting, spreading, moisture conditioning and compaction of a suitable volume of material to cap / cover facilities of high geochemical risk, and / or low shear strength that prohibits economically efficient construction methods. This rate assumes suitable capping material/s are available on site within 10 km, and an average cap thickness of approximately 2.5 m including growth media. This may require additional materials (i.e., capillary breaks, geofabric, etc.), specific material types (e.g. acid neutralising / consuming materials, competent rock etc.), and associated activities (i.e., load / haul / place / crush / screen / borrow etc.). Costs for haulage of specialised materials must be added separately if required.
8.03a	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	allow	Use alternate rate cell	Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.).
8.03b	Additional materials required for reshaping, capping / sealing of structure to facilitate water quality from runoff, seepage etc. meeting site-specific environment water quality values.	allow	Use alternate rate cell	Include additional cost to import materials (i.e., shale / clay, competent drainage materials etc.) and / or additional requirements (i.e., geofabric / composite lining etc.).

Item	Activity Description	Unit	Unit Prices	Justification and Assumptions for Proposed Rates
Rehabilitation				
9.01-	Source, cart and spread growth media (Select Haul Distance from List)	m^3	Select from List	If topsoil is not available on-site, then Virgin Excavated Natural Material (VENM) may need to be externally sourced.
9.01a	Source, cart and spread growth media - haul distance <1 km	m^3	$ 3.26	610 m3/hr with 4 x 657 scrapers at $430/hr, D10 trimming at $270/hr 3ha/day at 150mm depth
9.01b	Source, cart and spread growth media - haul distance >1 km but <2 km	m^3	$ 3.91	550 m3/hr with 4 x 657 scrapers at $430/hr, D10 trimming at $270/hr 3ha/day at 150mm depth
9.01c	Source, cart and spread growth media - haul distance >2 km but <5 km	m^3	$ 5.97	D10 (2ha/day) pushing from stockpiled material from 80t exc and artic trucks.
9.01d	Source, cart and spread growth media - haul distance >5 km	m^3	$ 8.22	Plus 90c/km - assumed 7.5 km. If haul distance is greater than 7.5 km, alternate rate option should be used - $9.50 + additional km x $0.90.
9.02-	Fill dams, voids etc. - Source local material, cart and spread to cap or backfill, cap thickness determined by approval / permit (Select Haul Distance from List)	m^3	Select from List	This item includes the volume of material requiring backfill using an excavator and scraper to fill the void and enable the establishment of rehabilitation.
9.02a	Fill dams, voids etc. - Source local material, cart and spread to cap or backfill, cap thickness determined by approval / permit (haul distance <1 km)	m^3	$ 3.90	D10 push over soft material at $270/hr 657 Scrapers cut to spoil at $430/hr, 150BCM/hr/machine, Ancillary watercart and grader at $0.75c/m3
9.02b	Fill dams, voids etc. - Source local material, cart and spread to cap or backfill, cap thickness determined by approval / permit (haul distance >1 km but <2 km)	m^3	$ 5.22	D10 push over soft material at $270/hr 657 Scrapers cut to spoil at $430/hr, 130BCM/hr/machine, Ancillary watercart and grader at $0.75c/m3
9.02c	Fill dams, voids etc. - Source local material, cart and spread to cap or backfill, cap thickness determined by approval / permit (haul distance >2 km but <5 km)	m^3	$ 6.88	D10 Rip and push into stockpile at $270/hr, 0.2ha/hr, 150mm deep. Excavator ($220/hr) load Artic Trucks (90c/km)
9.02d	Fill dams, voids etc. - Source local material, cart and spread to cap or backfill, cap thickness determined by approval / permit (haul distance >5 km)	m^3	$ 9.13	Generally overhaul rates will be 60c-$1.2, depending on truck fleet, loaders etc. If haul distance is greater than 7.5 km, alternate rate option should be used - $9.13 + additional km x $0.90
9.03	Shotcrete application on cuttings and steep slopes	m^2	$ 185.00	This rate is used to rehabilitate steep slopes of weathered rock, roadway cuttings, etc that cannot be cut back and stabilised.
9.04	Trim, rock rake & deep rip (includes levelling / landscaping and rip in 1 direction)	ha	$ 960.00	16H Grader @ $212 per hour - ripping in 1 direction only.
9.05	Deep rip hard stand / lay down areas	ha	$ 960.00	D10 dozer @ $332 per hour - deep rip in 2 directions @ 5 m spacing ~3 hr per hectare.
9.06	Planting mature trees (>15 cm)	allow	$ 20.00	4 m centres.
9.07	Planting tube stock (<15 cm)	allow	$ 10.00	4 m centres.
9.08	Direct seeding / fertiliser (pasture grass species)	ha	$ 1,240	Rate can fluctuate however this is a suitable standard rate.
9.09	Direct seeding / fertiliser (tree or native grass species)	ha	$ 2,095	Rate can fluctuate however this is a suitable standard rate.
9.10	Hydro-seeding with straw mulching and bitumen tack	m^2	$ 1.80	Rate can fluctuate however this is a suitable standard rate.
9.11	Single application of fertiliser (pasture)	ha	$ 420.00	Assumes 250 kg / ha. These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
9.12	Single application of fertiliser (trees)	ha	$ 140.00	These rates have fluctuated over the last few years however in light of current conditions (lower fuel prices, reduced demand etc) this is a suitable standard rate.
9.13	Spoil amelioration (adding lime / gypsum etc.)	ha	$ 860.00	Assumes 2.5 t / ha as an average application rate.
9.14	growth media amelioration with biosolids	ha	$ 1,015	Recent experience with agronomy projects.
9.15	Security fence around steep section of high wall	m	$ 55.00	Class 1 cyclone wire (or similar) security fence @ 2.1 m with 3-4 m post spacing - complying with AS1725-2010 - Chain-link fabric security fences and gates.
9.16	Construct **no-climb** stock fence around rehabilitated areas	m	$ 9.50	Standard rate for no-climb stock fencing.
9.17	Construct **standard** stock fence around rehabilitated areas	m	$ 4.00	Standard rate for standard stock fencing.
9.18	Purchase and erect warning signs	allow	$ 250.00	Compliance with AS 1319-1994 - Safety signs for the occupational environment - installed every 25 m.
9.19	Supply from external sources virgin excavated natural material (VENM) for growth media.	m^3	$ 80.80	D7 to spread material at $205/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $70/m3 for imported fill material.
9.20	Supply from external sources a combination of virgin excavated natural material (VENM) and spoil from large excavation for filing voids and/or capping etc.	m^3	$ 72.50	D10 push into void at $270/hr, Excavator ($220/hr) load Artic Trucks (90c/km) from imported stockpile - allow nominal rate of $60/m3 for imported fill material.
Water Management				
10.01	On-site treatment of contaminated water due to high salt (includes removal of metals etc, brine disposal and cost of mobile water treatment unit)	ML	$ 3,600	Rate can fluctuate depending on treatment type however this is a suitable standard rate for current programs at mining operations.
10.02	On-site treatment of contaminated water due to low pH (incudes removal of metals etc, neutralisation treatments and cost of mobile water treatment unit	ML	$ 1,500	Rate can fluctuate depending on treatment type however this is a suitable standard rate for current programs at mining operations.
10.03	Clean water dams to be retained after decommissioning – make safe and minor earthworks	allow	$ 2,500	Provisional sum for earthworks and revegetation required to rehabilitate dam batters etc suitable for re-use by an alternate land-user - D6 Dozer (or similar) @ ~$200 per hour and pasture grass.
10.04-	Remove sediments from the floor of the dam to enable it to be converted into clean water structure (Select Haul Distance from list)	m^3	Select from List	This item includes the volume of contaminated sediment requiring removal using an excavator, truck and dozer to clean out the dam.
10.04a	Remove sediments from the floor of the dam to enable it to be converted into clean water structure (haul distance <1km)	m^3	$ 3.55	80t excavator and 90c/m3 haul with artic trucks, 220m3/hr, two trucks required for short distance + 75c ancillary - excludes any stockpile treatment: no dozer (add 90c/m3 if required).
10.04b	Remove sediments from the floor of the dam to enable it to be converted into clean water structure (haul distance >1km but <2km)	m^3	$ 4.45	80t excavator and 90c/m3 haul with artic trucks, 220m3/hr, three trucks required for short distance + 75c ancillary - excludes any stockpile treatment: no dozer (add 90c/m3 if required).
10.04c	Remove sediments from the floor of the dam to enable it to be converted into clean water structure (haul distance >2km but <5km)	m^3	$ 7.25	80t excavator and 90c/m3 haul with artic trucks, 220m3/hr, five trucks required for short distance + 75c ancillary - excludes any stockpile treatment: no dozer (add 90c/m3 if required).
10.04d	Remove sediments from the floor of the dam to enable it to be converted into clean water structure (haul distance >5km)	m^3	$ 9.50	If haul distance is greater than 7.5 km, alternate rate option should be used - $9.50 + additional km x $0.90.
10.05	Removal of evaporation fans and/or other water transfer and management infrastructure	allow	$ 25,000	Provisional sum for removal of water management infrastructure.
10.06	Exploration sump decommissioning	m^3	$ 180.00	Rate based on capacity of sump developed for borehole. Includes filling of sump.
10.07	Water / mud disposal from sump	L	$ 0.30	Disposal of non-contaminated sediments removed from sump.

Item	Activity Description	Unit	Unit Prices	Justification and Assumptions for Proposed Rates
Creek Diversions				
11.01	Repairs and/or stabilisation of new or compromised water course diversion	m	$ 2,500	Assumes material is suitable for revegetating and has a reasonable chance of stabilising.
11.02	Long term maintenance of water course diversion – Channel constructed through backfilled material	m	$ 1,500	Assumes maintenance has been kept up and significant works are not required.
11.03	Long term maintenance of water course diversion – Channel constructed through competent material	m	$ 750.00	Assumes maintenance has been kept up and significant works are not required.
11.04	Installation of rock armouring	m^2	$ 6.00	Assumes competent material is locally available - multiply costs by 2 for sourcing and transporting from offsite location.
Maintenance of Rehabilitated Areas				
12.01	Maintenance of areas that have been shaped and seeded and **revegetation has been 'successful'**	ha	$ 900	Rehabilitation maintenance might include re-seeding, watering, fertilising, minor re-shaping, erosion control, inspections/audits - does not include major repair works.
12.02	Pest management on buffer lands, non-disturbed, and rehabilitated areas	ha	$ 150.00	Feral animal baiting programs if required and waste materials required to be removed.
12.03	Land management of undisturbed areas (rehabilitation, weeds, ferals, erosion and sediment control works)	ha	$ 400.00	Undisturbed areas within the lease boundary that require land management activities.
12.04a	Minor stabilisation works and maintenance of mine subsidence areas - ripping etc.	ha	$ 1,500	D8 Dozer @ $240 per hour and/or grader @ $160 per hour.
12.04b	Crack filling to repair subsidence impacts	m	$ 1,485	Undertake more substantial works to backfill cracks and/or sink holes (e.g., filling with mulch prior to grouting, grouting, etc.)
12.05a	Water course restoration to repair subsidence impacts	allow	Use alternate rate cell	Undertake more substantial works to remediate water courses (e.g., channel bed repairs, rock bar repairs, swamp stabilisation etc.)
12.05b	Create cut-through to re-establish natural water courses/drainage channels following subsidence	allow	$ 3,000	Includes all earthworks and revegetation required to re-establish the natural drainage profile of the subsided area.
12.06	Existing rehabilitation repair - minor	ha	$ 1,200	Areas requiring minor repair - rills, minor growth media replacement.
12.07	Existing rehabilitation repair - moderate	ha	$ 1,700	Areas requiring moderate repair - rills, significant growth media replacement.
12.08	Existing rehabilitation repair - major	ha	$ 2,500	Areas requiring major repair - rills, gullies, growth media replacement, some level of additional surface water management.
12.09	Existing rehabilitation repair - total failure of landform	ha	$ 40,000	Areas that require extensive rehabilitation repair - re-design and re-construction of landform.
Heritage Items				
13.01	The restoration and care and maintenance of items that have heritage significance	allow	Use alternate rate cell	Item for the redistribution of Aboriginal artefacts, preservation of European heritage items or a combination of activities.
Sundry Items				
14.01-	Development of an 'Unplanned' Project Closure Plan - for either State Significant or Non State Significant Developments	allow	Select from List	Provisional sum to be used to refine the conceptual closure plan into a detailed closure plan with execution strategies for rehabilitation activities.
14.01a	Development of an 'Unplanned' Project Closure Plan - State Significant Development	allow	$ 100,000	Provisional sum to be used to refine the conceptual closure plan into a detailed closure plan with execution strategies for rehabilitation activities.
14.01b	Development of an 'Unplanned' Project Closure Plan - Non State Significant Development	allow	$ 40,000	Provisional sum to be used to refine the conceptual closure plan into a detailed closure plan with execution strategies for rehabilitation activities.
14.02	DRG tender preparation and assessment, stakeholder consultation, risk assessment facilitation and management, statutory reporting and instruments, permitting and compliance requirements, document and data management	allow	Use alternate rate cell	Provisional sum for the NSW Government to prepare tender documentation (i.e. demolition, waste disposal, earthworks, environmental management etc.) manage stakeholders and establish permitting and compliance requirements for closure.
14.03	Site security during closure	yr.	$ 75,000	Provisional sum for site security measures required during closure. This includes nightly patrols and first response in the event of an out of hours incident.
14.04	HAZMAT Clean-up - cleaning and decontaminating plant and equipment, chemical storage locations, oil and grease traps, tanks, vessels, and pipe work etc	allow	$ 100,000	Provisional sum to perform the site clean-up and ensuring the demolition program is not interrupted due to potential contamination of waste streams.
14.05	Removal and disposal of radiation devices	each	$ 25,000	Provisional sum for removal and disposal of monitoring devices on conveyors using a radiation source (i.e., Americium – 241, Plutonium – 238, Caesium - 137 etc).
14.06	Additional fees for accessing State, Crown or other public lands for rehabilitation/remediation activities	allow	Use alternate rate cell	Provisional sum.
Third Party Project Management and Contingencies				
15.00	Mobilisation & Demobilisation for exploration programs	Item	$ 7,000	Assumes an exploration program of 10 or fewer holes and local contractors within 250 km are available to undertake rehabilitation of disturbance generated by dedicated exploration companies. Apply once per exploration pad.
15.00a	Mobilisation & Demobilisation for small mine or quarry	Item	$ 40,000	May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
15.01	Mobilisation & Demobilisation (Distance to site <150 km)	item	$ 100,000	May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
15.02	Mobilisation & Demobilisation (Distance to site >150 km but <500 km)	item	$ 150,000	May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
15.03	Mobilisation & Demobilisation (Distance to site >500 km but <1000 km)	item	$ 300,000	May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
15.04	Mobilisation & Demobilisation (Distance to site >1000 km)	item	$ 500,000	May include specialist demolition equipment and/or suitable plant to execute bulk earthworks as required.
15.05	Contingency	Total	X%	A contingent amount to account for "unkown unknowns" and areas were data / details of rehabilitation methods are uncertain.
15.06	Post Closure Environmental Monitoring	Total	X%	Includes all monitoring post closure execution works and compilation of all monitoring and maintenance data into a final rehabilitation report and submission for regalatory sign-off.
15.07	Project Management and Surveying	Total	X%	Includes all costs for project management of the closure execution works and post closure management requirements until land and/or tenure relinquishment.

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